CHAPTER 4

AIRCRAFT DILUTER DEMAND OXYGEN REGULATORS

TYPE AN6004-1, SERIES 2858-A1, 2858-A1A, 2858-B1, AND 2858-C1

Section 4-1. Description

4-1. GENERAL.

4-2. Aircraft Diluter Demand Oxygen Regulators Pioneer Type AN6004-1, Series 2858 (figures 4-1 and 4-2) are manufactured by Pioneer Central Division of Bendix Aviation Corp (CAGE 06840 and 19315). They are designed to regulate breathing oxygen to the aircrewmember during flight. Table 4-1 contains the leading particulars for the regulators.

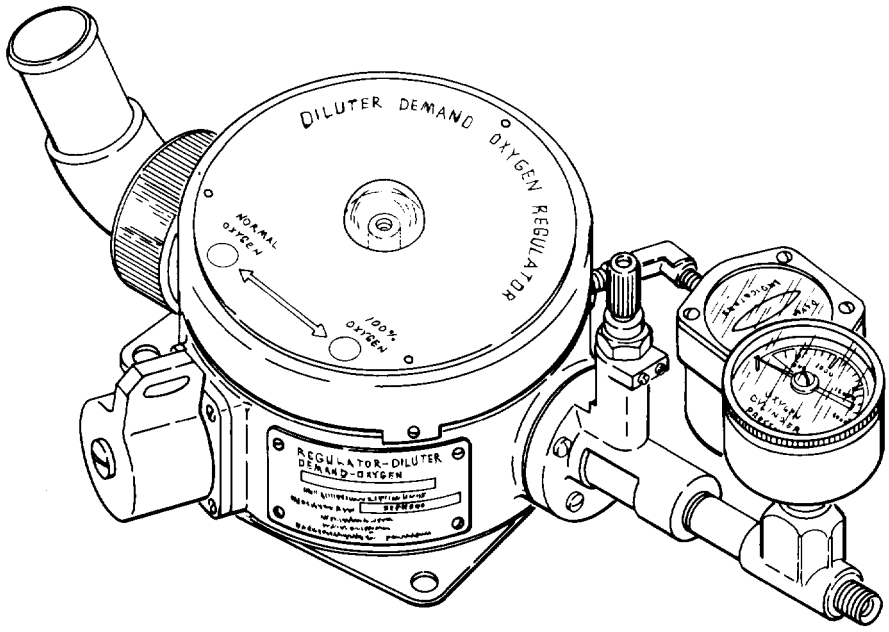

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Figure 4-1. Diluter Demand Oxygen Regulator – Pioneer Types 2858-A1 and 2858-A1A

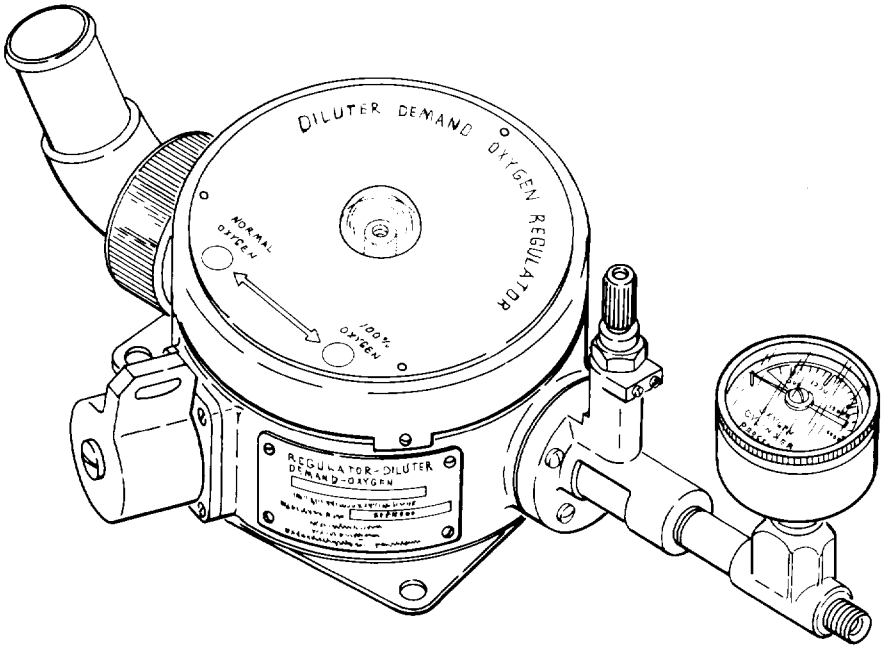

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Figure 4-2. Diluter Demand Oxygen Regulator – Pioneer Types 2858-B1 and 2858-C1

Table 4-1. Leading Particulars

Pioneer Type	Pressure	Altitude	Usable On Code
2858-A1	40-1800 psig	0-37,500 ft	A
2858-A1A	40-1800 psig	0-37,500 ft	B
2858-B1	40-1800 psig	0-37,500 ft	C
2858-C1	40-1800 psig	0-37,500 ft	D

Mounting	Surface
Visual Indicators	Pressure Gage Flow Indicator Air Valve Knob
Regulator Controls	
Air Valve Lever	Selects Normal or 100% Oxygen
Emergency Valve Knob	Removed by Acc. Bull. 24-61
Overall Dimensions	
Length	10-1/4 inches
Width	3-17/32 inches
Height	2-3/4 inches

4-3. The regulators are surface mounted diluter demand type regulators and are used with the MBU-14 series oxygen masks. The regulators incorporate an emergency valve.

WARNING

Accessory Bulletin 24-61 with supplement 1 of October 1961 directed that emergency knobs be removed from all type A-12 (P/N AN6004-1), Pioneer Central (P/N 2858) and ARO Equipment (P/N 17600) series oxygen regulators to preclude the possibility of over-pressurizing the MBU-14 series oxygen mask. Unrestricted flow from the emergency valve delivers oxygen to the mask at a pressure which is difficult to breath against, and may build up to a pressure within the mask great enough to blow the mask from the face. Possible injury to the lungs could also result.

4-4. CONFIGURATION.

4-5. Regulators are supplied in one basic configuration (table 4-1).

4-6. FUNCTION.

4-7. The characteristics and performance for which the regulators are designed are described below. Letters in parentheses relate to letters circled in figure 4-3.

1. Oxygen from the supply cylinder enters the regulator through the adapter assembly (A) and exerts pressure against the inlet valve (B), permitting oxygen to flow from the oxygen inlet orifice through the inlet valve and into the pressure reducer chamber which is the area around the pressure reducer (C).

2. Expansion and contraction of the bellows assembly (D) operates the pressure reducer lever (E) which controls the inlet and reduces cylinder pressure from 1800 pounds to 49 ±1 psig. When the chamber pressure reaches 49 ±1 psig, the bellows contracts, causing the pressure reducer lever to push the inlet valve up against the oxygen inlet orifice and shut off the flow of oxygen.

3. Relief valve assembly (NOT shown) covers the top of the pressure reducer chamber. It acts as a safety valve to prevent excessive pressure from building up within, if a malfunction should occur in the pressure reducer assembly. When pressure in the reducer chamber reaches 65 to 160 psig, the valve seat unseats and relieves excessive pressure.

4. Oxygen flows from the pressure reducer chamber into the lower half of the demand valve chamber (F). The demand valve is controlled by diaphragm (G) which, in turn, is controlled by the person using the regulator. The center of the diaphragm is attached to the diaphragm lever (H) by means of diaphragm knob (J) and diaphragm link (K). When the individual inhales, the diaphragm moves toward the demand valve which in turn causes the diaphragm lever to drop. When the diaphragm lever drops, pressure is exerted on the demand valve stem (L) which, in turn, opens the demand valve permitting oxygen to enter the upper half of the demand valve chamber. Oxygen then passes through the hole in the upper part of the demand valve chamber and into the injector assembly (M). When the user exhales, the diaphragm moves away from the demand valve, thus raising the diaphragm lever and releasing pressure on the demand valve stem, thereby closing the demand valve.

NOTE

If desired, either to check the operation of the regulator or to quickly obtain a continuous oxygen flow, the diaphragm knob (J) can be depressed by hand. This position will keep the demand valve open as long as the knob is depressed.

5. When air valve lever (N) is turned counterclockwise, the air valve cover and air valve body separate slightly, exposing two screen inlets, at the air valve entrance. Inside air valve is an aneroid assembly (O) which is sensitive to changes in atmospheric pressure. At sea level the aneroid contracts, permitting air to pass around the aneroid, unseat the air check valve disc (P) and enter the chamber when there is sufficient suction buildup caused by inhalation. As higher altitudes are reached, decreasing atmospheric pressure allows the aneroid to expand, gradually forcing the throttling plate (NOT shown) against the valve seat (NOT shown) and eventually shutting off the outside air flow into the chamber. This action occurs between 28,000 and 32,000 feet. Air admitted to the air chamber flows into the injector assembly. Should the user desire 100% oxygen prior to the aneroid expanding and cutting off outside air, turn the air valve lever clockwise and this action will shut off all outside air.

6. The air check valve, which closes when the regulator user exhales, is part of the check valve and aneroid assembly. This assembly prevents the escape of oxygen. It also prevents any flow of air until a definite suction is built up so the air-oxygen mixture will be the correct ratio for low flows.

7. Oxygen from the demand valve flows into the injector assembly. As it leaves the injector nozzle, the air from the air valve mixes with it. Upon inhalation, of the mixture of air and oxygen is drawn through the venturi (Q). The venturi delivers an air-oxygen mixture through the elbow assembly (R) to the oxygen mask.

8. The injector assembly is adapted to handle large quantities of oxygen under unusual conditions. The nozzle in the injector housing forms a valve with the injector seat. For high flows the nozzle unseats itself and releases a greater quantity of oxygen through the holes in the lower portion of the injector housing.

4-8. SERVICE LIFE.

4-9. Oxygen regulators shall remain in service for as long as they function correctly and do not require excessive repair (cost exceeds 75% of original cost of regulator). All affected silicone rubber parts shall be replaced whenever a regulator is disassembled for repair.

4-10. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

4-11. Section 4-5, Illustrated Parts Breakdown, contains information on each assembly, subassembly and component part of the regulators. The figure and index number, reference or part number, description, and units per assembly are provided with the breakdown.

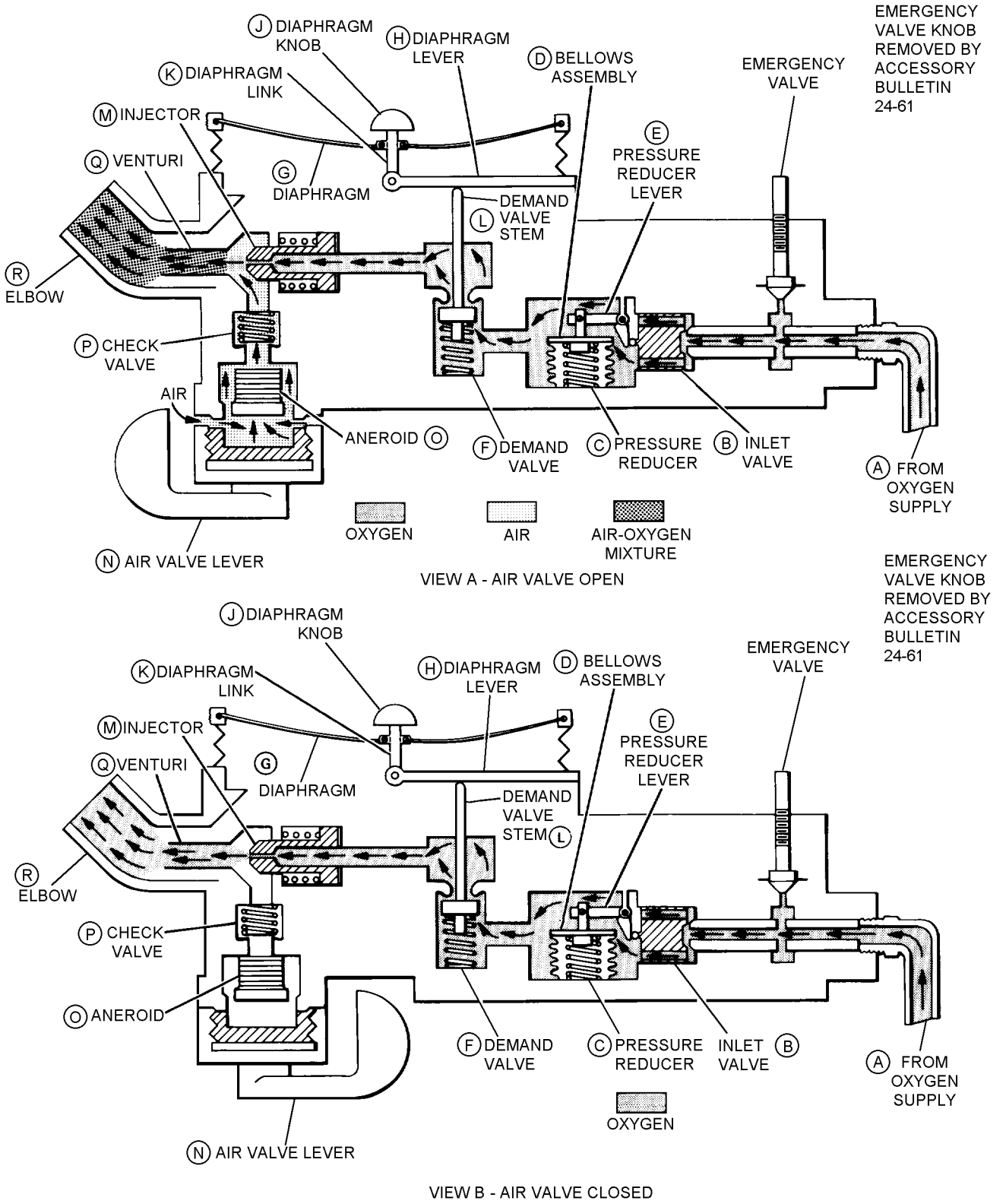


Figure 4-3. Schematic Operational Diagram – Normal Flow (View A and B)

Section 4-2. Modifications

4-12. GENERAL.

4-13. Oxygen Regulators P/N 2858-A1, 2858-A1A, 2858-B1, and 2858-C1 shall be modified in accordance with the following directive:

Accessory Bulletin 24-61.

Section 4-3. Performance Test Sheet Preparation

4-14. GENERAL.

4-15. Preparation of Oxygen Performance Test Sheets requires that, through the use of various graphs, actual flows given in applicable directives and provided in this section be converted to indicated flows.

4-16. Flows provided in applicable directives are stated in liters per minute (lpm) and are not measurable by the manometers used in the oxygen regulator test stands. The flows must be converted to inches of water pressure (inH_2O), the form of measurement which can be read on the test stand manometers.

NOTE

The various graphs supplied with each Oxygen System Components Test Stand, Model 62-A-116-E1, Model 1172AS100, and Model 1316AS100, are used in converting flows. These graphs are not interchangeable between test stands. A new set of graphs will be provided each time the test stand is calibrated.

4-17. The information provided in the tables in this section is to be recorded on the Performance Test Sheet (figure 4-4).

4-18. The Performances Test Sheet is a sample only, but may be reproduced for local use (figure 4-4).

4-19. The following tests require conversion of flows from actual lpm to indicated inH_2O:

1. Flow Indicator Test
2. Flow Suction Test
3. Oxygen Ratio Test

4-20. Each oxygen regulator must be subjected to the following tests:

1. High Pressure Leakage Test
2. Outward Leakage Test
3. Inward Leakage Test
4. Pressure Gage Test
5. Flow Indicator Test
6. Flow Suction Test
7. Oxygen Ratio Test

4-21. REGULATOR PERFORMANCE TESTS.

4-22. HIGH PRESSURE LEAKAGE TEST. Actual pressures and allowable leakage for the High Pressure Leakage Test are shown on the Performance Test Sheet (figure 4-4).

4-23. OUTWARD LEAKAGE TEST. Actual pressures and allowable leakage for the Outward Leakage Test are shown on the Performance Test Sheet (figure 4-4).

4-24. INWARD LEAKAGE TEST. Actual pressures and allowable leakage for the Inward Leakage Test are shown on the Performance Test Sheet (figure 4-4).

4-25. PRESSURE GAGE TEST. Actual pressures and tolerances for the Pressure Gage Test are shown on the Performance Test Sheet (figure 4-4).

4-26. FLOW INDICATOR TEST. Actual output flows (lpm) for the Blinker Test section of the Performance Test Sheet must be converted to indicated output flows (inH_2O). To convert the flows, proceed as follows:

4-27. Diluter Lever Normal Oxygen Position. Use the air line of the Sea Level Output Graph.

1. Locate the actual output at the bottom of the graph and trace the selected line up to the air line.

2. Trace the line from where the actual output and air lines intersect across the graph to the left-hand column to determine indicated inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

4-28. Diluter Lever 100% Oxygen Position (Sea Level). Use the N_2 line on the Sea Level Output Graph.

1. Locate actual output (lpm) at the bottom of the graph and trace the selected line up to the N_2 line.

2. Trace the line from where the actual output and N_2 lines intersect across the graph to the left-hand column to determine indicated inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

4-29. FLOW SUCTION TEST. The Flow Suction Test shall be performed at sea level with the diluter control lever in both the 100% OXYGEN and NORMAL OXYGEN position. Actual (lpm) flows are converted to indicated (inH_2O) flows by using the Sea Level Output Graphs. The air line is used for NORMAL OXYGEN flows, and the N_2 line is used for 100% OXYGEN flows. Convert the actual flows as follows:

NOTE

Test Stand Input and Output Flow Graphs may vary in makeup, according to the activity performing the test stand calibration. Some test stands may have a single output graph and an input graph with various altitude lines, while others may have separate graphs for each altitude. Ensure that specified graph is used.

1. Locate the desired lpm line at the bottom of the Sea Level Output Graph (figure 4-4).

2. Trace selected lpm line up to where it intersects the air line (NORMAL indicated output) on N_2 line (100% indicated output).

3. Trace the line from point of intersection across the graph to the left-hand column to determine indicated inH_2O.

4. Enter this figure in the appropriate block on the Performance Test Sheet.

5. Repeat steps 1 through 4 for all output flows (lpm) given in figure 4-4.

4-30. OXYGEN RATIO TEST. Actual flows and oxygen percentages (figure 4-4) used for the Oxygen Ratio Test must be converted to indicated flows and oxygen averages. All actual flows must be converted to indicated flows. The results of these computations shall be entered in the appropriate columns within the Oxygen Ratio Test portion of the Performance Test Sheet. To find average oxygen, indicated output, corrected indicated output, actual, and indicated input flows, proceed as follows:

NOTE

Test Stand Input and Output Flow Graphs may vary in makeup, according to the activity performing the test stand calibration. Some test stands may have a single output graph and an input graph with various altitude lines, while others may have separate graphs for each altitude. Ensure that specified graph is used.

4-31. Average Oxygen. These figures are provided but are computed as follows: Average oxygen is found by adding the minimum and maximum oxygen percentages (figure 4-4) then dividing the sum by 2 (e.g., 6% + 45% = 51% ÷ 2 = 25.5%).

1. Enter the resulting figure in the appropriate block on the Performance Test Sheet.

2. Repeat this procedure for all minimum and maximum oxygen percentages given in figure 4-4.

REGULATOR PERFORMANCE TEST SHEET
BENDIX PIONEER TYPES
2858-A1, 2858-A1A, 2858-B1, 2858-C1

DATE _____ TYPE _____ SERIAL NO. _____

TEST STAND SERIAL NO. _____ TESTED BY _____ CDI _____

1. HIGH PRESSURE LEAKAGE TEST _____ (50 psig – 3/16 in. bubble – 3 sec)

2. OUTWARD LEAKAGE TEST _____ (70 psig – 15 inH_2O allowable leakage 300 ccm)

3. INWARD LEAKAGE TEST _____ (5 inH_2O suction – allowable leakage 1450 ccm)

4. PRESSURE GAGE TEST, NOTE: TESTED AT AMBIENT TEMPERATURE OF 70°F.

PRESSURE GAGE (PSIG)	TOLERANCE PSIG	BEFORE TAP	AFTER TAP
500	±50		
1000	±50		
1500	±50		

5. BLINKER (IF FLOW INDICATOR) TEST (INLET PRESSURE 150 PSIG)

ALTITUDE/ PRESSURE	DILUTER KNOB	OUTPUT			BLINKER POSITION
		ACTUAL	INDICATED	READING	
SEA LEVEL	NORMAL	20			FULLY OPEN
SEA LEVEL	NORMAL	0			CLOSE IMMED
SEA LEVEL	100%	8			FULLY OPEN
SEA LEVEL	100%	0	0		CLOSE IMMED

6. FLOW SUCTION TEST

ALTITUDE	INLET PRESSURE (PSIG)	ACTUAL OUTPUT (LPM)	NORMAL		100 PERCENT		MAXIMUM SUCTION (inH_2O)
			INDICATED OUTPUT	READING	INDICATED OUTPUT	READING	
SEA LEVEL	50	30					-0.50
SEA LEVEL	150	50					-0.70
SEA LEVEL	150	70					-1.5

7. OXYGEN RATIO TEST (INLET PRESSURE 150 PSIG)

ALTITUDE (1000 FT)	OXYGEN PERCENT		OUTPUT				INPUT				
	MIN	MAX	AVERAGE PERCENT	ACTUAL OUTPUT (LPM)	INDICATED OUTPUT (inH_2O)	CORRECTED INDICATED OUTPUT	ACT HI	ACT LOW	IND HI	IND LOW	READING
10	6	45	25.5	15			14.1	8.25			
10	6	60	33	85			79.9	34			
20	24	55	39.5	15			11.4	6.75			
20	24	80	52	85			64.6	17			
28	60	100	80	15			6	0		0	
28	60	100	80	85			34	0		0	
32	98	100	99	85			1.7	0		0	

8. REGULATOR OXYGEN PURGE: APPLY 500 PSIG AVIATORS BREATHING OXYGEN AND FLOW 1 TO 3 MINUTES

Figure 4-4. Performance Test Sheet

4-32. Indicated Output. To convert actual output flows (lpm) given in figure 4-4 to indicated output flows (inH_2O), proceed as follows:

1. Locate the desired actual output at the bottom of the Output Graph (figure 4-4).

2. Trace the selected line up to the point of intersection with the appropriate altitude air line.

3. Trace the line on the graph from where the desired lpm and altitude air lines intersect across the graph to the left-hand column to determine indicated inH_2O.

4. Enter this figure in appropriate block on the Performance Test Sheet.

NOTE

Flows at 28,000 and 32,000 feet are converted by using the next higher altitude air line or Output Graph (e.g., 30,000-foot Output Graph or 35,000-foot Output Graph).

4-33. Corrected Indicated Output. Corrected indicated output is indicated output with the required percentage of nitrogen subtracted. To find correct indicated output, proceed as follows:

NOTE

Use Oxygen/Air/Nitrogen Conversion Graph provided in NAVAIR 17-15BC-21 Technical Manual.

1. Locate the indicated output (inH_2O) at the bottom of the N_2 Conversion Graph.

2. Find the average oxygen percentage on the Performance Test Sheet corresponding to the selected indicated output.

NOTE

Select percentage line on N_2 Conversion Graph nearest to average oxygen figure selected from Average Oxygen column on Performance Test Sheet.

3. Follow the indicated output line selected on the N_2 Conversion Graph up to the appropriate N_2 percentage line.

4. Trace the line on the graph where the selected indicated output and N_2 percentage lines intersect across the left-hand column to determine inH_2O.

5. Enter this figure in the appropriate block on the Performance Test Sheet.

6. Repeat steps 1 through 5 for all required indicated output flows.

4-34. Actual High Air. These figures are provided, but are computed as follows: Find the actual high air by subtracting the minimum oxygen percentage (figure 4-4) from 100%; multiply the result by the corresponding actual output (e.g., 100% - 6% = 94% x 85 lpm = 79.90 lpm).

1. Enter the resulting figure in the actual high air column on the Performance Test Sheet.

2. Repeat the procedure for all minimum oxygen percentages given in figure 4-4.

4-35. Actual Low Air. These figures are provided, but are computed as follows: Find the actual low air by subtracting the maximum oxygen percentage from 100%; multiply the result by the corresponding actual output (e.g., 100% - 60% = 40% x 85 lpm = 34.00 lpm).

1. Enter the resulting figure in the actual low air column on the Performance Test Sheet.

2. Repeat the procedure for all maximum oxygen percentages given in figure 4-4.

4-36. Indicated High Air (Input). To convert actual high air to indicated high air, proceed as follows:

1. Locate the actual input (lpm) at the bottom of the Test Stand Input Graph.

NOTE

Flows at 28,000 and 32,000 feet are converted by using the next higher altitude air line or Input Graph (e.g., 30,000-foot Input Graph or 35,000-foot Input Graph).

2. Trace the selected line up to where it intersects the appropriate altitude line.

3. Trace the line on the graph where the actual input and desired altitude lines intersect across the graph to the left-hand column to determine indicated inH_2O.

4. Enter this figure in the appropriate block on the Performance Test Sheet.

5. Repeat steps 1 through 4 for all actual high air figures previously entered on Performance Test Sheet.

4-37. Indicated Low Air (Input). To convert actual low air to indicated low air, proceed as follows:

1. Locate the actual input (lpm) at the bottom of the Test Stand Input Graph.

2. Trace the selected line up where it intersects the appropriate altitude line.

3. Trace the line on the graph where the actual input and desired altitude lines intersect across the graph to the left-hand column to determine indicated inH_2O.

4. Enter this figure in the appropriate block on the Performance Test Sheet.

5. Repeat steps 1 through 4 for all actual low airflow figures previously entered on Performance Test Sheet.

Section 4-4. Maintenance

4-38. GENERAL.

4-39. This section contains the procedural steps for inspecting, testing, troubleshooting, disassembly, cleaning, assembly and adjusting of aircraft panel mounted oxygen regulators.

NOTE

The regulator shall be considered beyond economical repair when the costs of repair parts exceed approximately 75% of the cost of the regulator.

4-40. Procedural steps outlined in this section are listed under the aircraft inspection cycle in which they are required and are further listed in the sequence in which they normally occur.

4-41. Bench test shall be performed on aircraft oxygen regulators prior to being placed in service and during the Phase/Calendar or SDLM (Standard Depot Level Maintenance) Inspection cycle of the aircraft in which installed. See applicable PMS (Planned Maintenance System) publications for specific intervals. In no case shall the interval exceed 448 days. Regulators shall be subjected to a bench test if a malfunction is suspected, and after repair or replacement of damaged parts.

4-42. Bench test shall be performed using Oxygen Systems Components Test Stand, Model 1172AS100 or 1316AS100. Refer to appropriate Ground Support Equipment manual for identification of test stand controls and indicators referred to in bench test.

4-43. Due to the complexity of the Model 1172AS100 or 1316AS100 test stand, it is essential that the operator become thoroughly familiar with the test stand prior to performing bench test.

4-44. INSPECTION.

4-45. TURNAROUND/PREFLIGHT/POSTFLIGHT/TRANSFER INSPECTIONS. Turn-around/Preflight/Postflight/Transfer Inspections consist of a Visual Inspection performed in conjunction with aircraft inspection requirements for the aircraft in which these regulators are installed. Visually inspect the following:

1. Legibility of all markings.

2. Low or improper reading on regulator pressure gage.

3. Air valve lever in 100% OXYGEN position.

4. Supply control in OFF position.

5. Regulator and surrounding area for freedom from dirt and hydrocarbons.

6. Delivery hose and connector hose for cuts, fraying, kinking, hydrocarbons, and general condition.

4-46. If discrepancies are found or suspected, Maintenance Control shall be notified.

4-47. Regulators which do not pass inspection and cannot be repaired in the aircraft shall be removed and replaced by Ready For Issue (RFI) regulators. Non-RFI regulators shall be forwarded to the nearest maintenance activity having repair capability.

4-48. ACCEPTANCE/DAILY INSPECTIONS. Acceptance/Daily Inspections consist of a Visual Inspection followed by a Functional Test. These inspections and tests shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the regulators are installed. To perform the inspection, proceed as follows:

WARNING

When working with oxygen, make certain that clothing, tubing fittings, and equipment are free of oil, grease, fuel, hydraulic fluid, or any combustible liquid. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

4-49. Visually inspect the regulators in accordance with paragraph 4-45.

4-50. Functional Test. To perform a Functional Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen, Type 1	MIL-O-27210

1. Open supply control valve.

2. Oxygen cylinder pressure gage must read 1800 psig.

3. Place diluter control knob in NORMAL OXYGEN position.

4. Connect oxygen hose to quick-disconnect, place mask to face, and inhale. Proper regulator operation will be indicated by flow indicator assembly showing black during inhalation and white during exhalation.

NOTE

Flow indication may be achieved by depressing diaphragm knob or diaphragm depressor in the center of the regulator cover and by observing the oxygen flow indicator change from white to black.

4-51. Upon completion of functional test, secure regulator as follows:

1. Disconnect mask from supply hose.

2. Ensure that diluter control knob is in 100% OXYGEN position.

3. Close supply control valve.

4-52. If discrepancies are found or suspected, Maintenance Control shall be notified.

4-53. Regulators which do not pass inspection and can not be repaired in the aircraft, shall be removed and replaced by RFI regulators. Non-RFI regulators shall be forwarded to the nearest maintenance activity having repair capability.

4-54. CALENDAR/PHASE/SPECIAL/SDLM INSPECTIONS. Calendar, Phase, Special, and SDLM Inspections require removal of the regulators from the aircraft. See applicable PMS publication for specified intervals. In no case shall the interval exceed 448 days. Upon removal from the aircraft, regulators shall be subjected to a Visual Inspection and Bench Test.

4-55. Aircraft surface mounted regulators failing the Bench Test shall be repaired. SM&R codes define repairability of components and lowest level of maintenance authorized in accordance with Naval Aviation Maintenance Program, OPNAVINST 4790.2 Series.

4-56. BENCH TEST.

WARNING

Because of possible vacuum pump explosion, only water-pumped nitrogen, Type 1, Class 1, Grade B (Fed Spec BB-N-411) shall be used in testing oxygen regulators. Do not use 3500 psig nitrogen cylinder. These cylinders can not be certified contaminant free.

NOTE

Tests are arranged so they proceed from one test to the next with a minimum of flow and altitude changes. Troubleshooting tables are provided following each test (table 4-2 through 4-8). Regulators shall be mounted on a horizontal plane in the test chambers.

4-57. Unless otherwise specified in a specific test, the pressure applied, flows drawn, etc. shall be the same for all 2858 regulators.

4-58. The Bench Test shall be performed using an Oxygen System Components Test Stand, Model 1172AS100 or 1316AS100.

WARNING

Ensure altitude chamber is configured in accordance with NAVAIR 17-15BC-21, WP003 00, Figure 3, sheets 2 thru 4 as applicable. Ensure High Pressure or Low Pressure Hose Assembly listed in NAVAIR 17-15BC-21, WP031 00, Figure 1 or Figure 2 is attached to N_2 Input Connection (18) or Tee Connection (28) in altitude chamber as applicable for the oxygen regulator being tested. Remove hose assembly not being used and cap connection (18) or (28) when not in use. For regulators requiring inlet pressures greater than 175 psig, the High Pressure Hose Assembly in NAVAIR 17-15BC-21, WP031 00, Figure 1 shall be used.

NOTE

Nitrogen supply cylinders utilized in testing oxygen components contain a maximum pressure of 1800 psig. For tests requiring pressures of 1800 psig, utilize highest available pressure, but in no case shall this pressure be less than 500 psig.

4-59. HIGH PRESSURE LEAKAGE TEST. To perform the High Pressure Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Nitrogen, Oil-Free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Ensure that test stand valves are closed, then open N_2 supply cylinder valve.

2. Ensure that regulator emergency valve is in OFF position.

3. Place regulator diluter control knob in 100% OXYGEN position.

NOTE

Regulator should be mounted on a horizontal plane in the test chamber.

4. Connect regulator inlet to N_2 INPUT connection (18) in altitude chamber.

5. Turn INLET PRESS. ON/OFF valve (L) to ON position.

6. Using LOW PRESS. REGULATOR (N), apply 50 psig to regulator inlet.

7. Test shut-off by depressing and releasing the diaphragm knob several times, maintaining desired pressure.

WARNING

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended material/sediment is considered contaminated and shall be disposed of. Compound having peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

8. Draw a film of leak detection compound across the regulator outlet. The bubble shall not advance more than 3/16 inch in 3 seconds. If bubble extends more than allowed, repeat test three or four times. Distension could be caused by expansion of gas by temperature difference between inside and outside of regulator.

NOTE

Determine whether the leak is coming through, or around the working parts of the regulator.

9. If bubble advance continues to be more than allowed, determine where leak is coming from by performing steps a through d and locate probable cause by using troubleshooting chart (table 4-2).

Table 4-2. Troubleshooting (High Pressure Leakage Test)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-10.		
High pressure leaks through working parts.	Diaphragm lever (72) set too high.	Reset diaphragm lever 11/64 inch above the top edge of regulator case.
	Demand valve not sealing (seat cut or seat retainer cocked).	Replace demand valve seat (61).
	Bent or burred demand valve stem (67).	Replace demand valve stem (67).
	Wrinkled or tight diaphragm (diaphragm lever locknut tightened before diaphragm assembly, positioned in case).	Reposition or replace diaphragm (36).
	Pressure reducer set too high.	Reset to 48 ± 1 (100 psig inlet).
	Weak demand valve spring (60).	Replace demand valve spring (60).
High pressure leaks around working parts.	Oxygen inlet gasket (16) defective.	Replace oxygen inlet gasket (16).
	Leakage around pressure reducer chamber.	Tighten all screws; if necessary, replace gasket (44).
	Inlet valve (13) leaking (scored seat or improper setting of inlet valve).	Readjust inlet valve setting or replace inlet valve assembly (13).
	Leakage around demand valve chamber.	Tighten screws (59) or replace gaskets (44) and (46).
	Leakage through emergency valve channel.	Replace packings (9, figure 4-14), and tighten emergency valve body (6, figure 4-14).
	Leakage through pressure reducer screw (15) (caused by hole in pressure reducer bellows).	Replace pressure reducer assembly (39).

a. Unscrew elbow nut and remove elbow.

b. Place a film of leak detection compound over the end of the venturi.

c. If bubble expands, the leak is through the working parts.

d. If bubble does not expand, the leak is around the working parts.

10. Relieve pressure to regulator by backing out on LOW PRESS. REGULATOR (N) and opening SYSTEM BLEED valve (S).

11. Close SYSTEM BLEED valve.

12. Using HIGH PRESS. REGULATOR (Q), apply 500 psig to regulator inlet.

13. Repeat steps 7 and 8.

14. Turn INLET PRESS. ON/OFF valve (L) to OFF position.

15. Turn HIGH PRESS. REGULATOR (Q) to vent.

16. Bleed test stand using SYSTEM BLEED valve (S).

17. Bleed test pressure from regulator by depressing diaphragm knob.

4-60. OUTWARD LEAKAGE TEST. To perform the Outward Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type I	MIL-L-25567
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Place regulator diluter control knob in NORMAL OXYGEN position.

2. Connect regulator outlet to piezometer (26) in altitude chamber. Connect a line from LOW PRESS. connection (19) to REF. TAP connection (21) in chamber.

3. Turn test stand INLET PRESS. ON/OFF valve (L) to OFF position.

4. Adjust LOW PRESS. REGULATOR (N) until 70 psig is indicated on a REGULATED LOW PRESS. gage (11).

5. Turn LEAKAGE SELECTOR valve (F) to the high range position.

6. Turn PRESS. SELECTOR valve (D) to H_2O position and slowly open LEAKAGE CONTROL valve (E) until 15.0 inH_2O is indicated on PRESS./SUCTION manometer (4).

NOTE

Maintain 15.0 inH_2O with LEAKAGE CONTROL valve (E) throughout test.

7. If leakage is indicated on HIGH RANGE LEAKAGE rotameter (8), maximum allowable leakage is 0.3 lpm (300 ccm).

8. Repeat steps 2 through 7 with diluter control knob in 100% OXYGEN position.

9. Close LEAKAGE CONTROL valve (E).

10. If leakage is excessive, locate probable cause using troubleshooting chart (table 4-3).

11. Back out on LOW PRESS. REGULATOR valve (N).

12. Slowly open SYSTEM BLEED valve (S) and LEAKAGE CONTROL valve (E), bleed system, and close both valves.

13. Disconnect hose from LOW PRESS. connection (19) and REF. TAP connection (21) in altitude chamber.

4-61. INWARD LEAKAGE TEST (TEST STAND 1172AS100 ONLY). To perform the Inward Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter	Fabricate IAW NAVAIR Dwg 1172AS136
1	Oxygen System Components Test Stand	1172AS100

1. Ensure that test stand valves are closed, then open N_2 supply cylinder valve.

2. Place regulator diluter control knob in 100% OXYGEN position.

NOTE

Regulator should be mounted on a horizontal plane in the test chamber.

3. Cap regulator inlet.

Table 4-3. Troubleshooting (Outward Leakage Test)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-10.		
Excessive external leakage.	Leakage through air check valve (20) NORMAL position-bent or scored air check valve disc (8, figure 4-16).	Replace air check valve disc (8, figure 4-16).
	Leakage through air check valve 100% OXYGEN position-leakage around air valve body gasket (9, figure 4-15).	Tighten air valve body screws (18). Replace gasket (19).
	Ruptured or leaking diaphragm (36).	Replace diaphragm (36).
	Leakage through case.	Tighten all screws and replace gaskets as required.
	Leaking elbow connection (22).	Tighten elbow nut (21) and replace gasket (24) as required.
	Leakage through flow indicator piston seal (22, figure 4-18) after applying leak detection compound to flow indicator vent hole.	Replace flow indicator piston seal (22, figure 4-18).
	Leakage around flow indicator packing washer (9, figure 4-18).	Replace packing washer (9, figure 4-18).

4. Using an adapter (NAVAIR Drawing 1172AS136), connect the regulator outlet to N_2 INPUT connection (18) in the altitude chamber.

5. Connect a line from LOW PRESS. connection (19) to REF. TAP connection (21) in altitude chamber. Plug the rubber hose attached to piezometer (26), using piezometer plug supplied with the test stand.

WARNING

Ensure LOW PRESS, REGULATOR (N) is not loaded. This will prevent N_2 supply cylinder pressure from passing on to INLET PRESS. ON/OFF valve (L) which could damage the item under test or cause injury to the test stand operator.

Ensure that no pressure is indicated on regulated high pressure gage (10) regulated low pressure gage (11) and N_2 input pressure gage (27).

6. Turn INLET PRESS. ON/OFF valve (L) to the ON position.

7. Turn vacuum pump on.

8. Turn PRESS. Selector valve (D) to the H_2O position and fully open LEAKAGE CONTROL valve (E).

9. Ensure LEAKAGE SELECTOR valve (F) is in high range position.

NOTE

HIGH RANGE LEAKAGE rotameter (8) is calibrated with an applied pressure of 70 psig. The inward leakage test requires that a suction of 5.0 inH_2O be applied to the regulator outlet and the rotameter. This pressure difference (5.0 inH_2O at 70 psig) creates a wide variance between actual leakage and indicated leakage. The maximum allowable leakage for the inward leakage test is 500 ccm. An actual leakage of 500 ccm will be displayed on HIGH RANGE LEAKAGE rotameter (8) as an indicated 1450 ccm.

10. Slowly open OUTPUT valve (C) until 5 inH_2O suction is indicated on PRESS./SUCTION manometer (4). Any leakage will be displayed on HIGH RANGE LEAKAGE rotameter (8). The maximum allowable indicated leakage is 1450 ccm (actual 500 ccm). Record indicated leakage on Performance Test Sheet.

11. Close OUTPUT valve (C) and LEAKAGE CONTROL valve (E). Turn vacuum pump off. Turn INLET PRESS. ON/OFF valve (L) to the OFF position.

12. Disconnect line from LOW PRESS. connection (19) and REF. TAP connection (21) in altitude chamber. Disconnect regulator outlet from N_2 INPUT connection (18). Remove piezometer plug from piezometer (26).

13. If excessive leakage is indicated, locate probable cause using troubleshooting chart (table 4-4).

Table 4-4. Troubleshooting (Inward Leakage Test)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-10.		
Excessive external leakage.	Ruptured diaphragm (36), leakage through case.	Replace diaphragm (36); tighten screws or replace gaskets as required.
	Leakage through elbow connection (22).	Tighten elbow nut (21) or replace elbow gasket (24).
	Leakage through air valve.	Tighten screws (18) or replace gaskets (19) and (10, figure 4-15).
	Leakage through flow indicator piston seal (22, figure 4-18).	Replace flow indicator piston seal (22, figure 4-18).
	Leakage around flow indicator packing washer (9, figure 4-18).	Replace flow indicator packing washer (9, figure 4-18).

4-62. INWARD LEAKAGE TEST (TEST STAND MODEL 1316AS100 ONLY). To perform the Inward Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1316AS100

1. Ensure all test stand valves and regulators are properly secured and open N_2 supply cylinder.

2. Place oxygen regulator supply control valve lever in the OFF position and diluter control lever in the 100% OXYGEN position.

3. Ensure oxygen regulator emergency pressure control lever is in NORMAL position and cap the regulator inlet.

4. Connect a line from 20 TO 200 LEAKAGE connection (20) to REF TAP and connection (21) in altitude chamber.

5. Connect regulator outlet to piezometer (26).

6. Turn on vacuum pump.

7. Turn PRESSURE SELECTOR valve (D) to H_2O position.

8. Place OVERBOARD ON/OFF valve (T) to ON position.

9. Slowly open INWARD LEAKAGE REF valve (P) until 9 inH_2O suction is indicated on pressure suction manometer (4).

10. Observe OVERBOARD LEAKAGE rotameter (6), maximum allowable leakage is 200 ccm. Record reading on Performance Test Sheet.

11. Close INWARD LEAKAGE REF valve (P) and place OVERBOARD ON/OFF valve (T) in the OFF position.

12. Disconnect line from 20 TO 200 LEAKAGE connection (20) and REF TAP and connection (21).

13. Disconnect regulator outlet from piezometer (26) and remove cap from regulator inlet.

14. If excessive leakage is indicated, locate probable cause using troubleshooting chart (table 4-4).

4-63. PRESSURE GAGE TEST. To perform the Pressure Gage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Connect regulator inlet to N_2 INPUT connection (18).

2. Turn INLET PRESS. ON/OFF valve (L) to ON.

CAUTION

LOW PRESS. REGULATOR (N) can only be used when applying pressures below gage guard setting (165 to 175 psig) to an item under test. For pressures above gage guard setting HIGH PRESS. REGULATOR (Q) must be used.

3. Using HIGH PRESS. REGULATOR (Q), slowly increase pressure to each test pressure specified in figure 4-4. Performance Test Sheet.

NOTE

Regulator pressure gage readings must be recorded twice, once before and once after tapping pressure gage.

4. Check tolerance by comparing regulator pressure gage reading with test stand N_2 INPUT PRESS. gage (27).

5. Back out LOW PRESS. REGULATOR (N).

6. Continue test for 500 psig pressure, using HIGH PRESS. REGULATOR (Q).

7. Turn HIGH PRESS. REGULATOR (Q) to vent.

8. Bleed test stand using SYSTEM BLEED valve (S). Bleed regulator by depressing diaphragm knob.

9. If pressure gage is not within tolerances, replace pressure gage.

4-64. FLOW INDICATOR TEST. To perform the Flow Indicator Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Ensure that diluter control knob is in NORMAL OXYGEN position.

2. Connect regulator outlet to piezometer (26).

3. Using LOW PRESS. REGULATOR (N), apply 150 psig to the regulator inlet.

4. Turn vacuum pump on.

5. Using OUTPUT valve (C), draw 20 lpm through regulator. Blinker must be fully opened.

6. Close OUTPUT valve (C). Zero flow blinker must close immediately.

7. Place diluter control knob in the 100% OXYGEN position.

8. Using OUTPUT valve (C), draw 8 lpm flow through the regulator. Blinker must be fully open.

9. Close OUTPUT valve (C). Zero flow blinker must close immediately.

10. If flow indicator fails the above test, locate probable cause using troubleshooting chart (table 4-5).

Table 4-5. Troubleshooting (Flow Indicator)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-18.		
Sticking lever assembly (10).	Friction between frame (17) and lever assembly (10).	Disassemble indicator and check clearance between frame and the two levers.
Leakage (apply leak detection compound over vent and observe).	Loose retaining ring (7).	Using spanner wrench, tighten retaining ring (7).
	Defective packing washer (9).	Replace packing washer (9).
	Leaking piston seal (22).	Replace piston seal (22).

4-65. FLOW SUCTION TEST. To perform the Flow Suction Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Connect regular inlet to N_2 INPUT connection (18) in altitude chamber.

2. Connect regulator outlet to piezometer (26) in altitude chamber.

3. Ensure that PRESS. SELECTOR valve (D) is in the H_2O position.

4. Place regulator diluter knob in 100% OXYGEN position.

5. Turn test stand INLET PRESS. ON/OFF valve (L) to the ON position.

6. Turn vacuum pump on.

7. Using LOW PRESS. REGULATOR (N), set the inlet pressure at each inlet pressure specified on the Performance Test Sheet (figure 4-4).

8. Using OUTPUT valve (C), set flows specified in Performance Test Sheet on OUTPUT FLOW manometer (1). Suction values will be displayed on PRESS./SUCTION manometer (4). Record readings on Performance Test Sheet.

9. If regulator fails the Flow Suction Test, locate probable cause using troubleshooting chart (table 4-6).

NOTE

With no suction on the regulator (OUTPUT valve (C) closed), maximum flow through regulator shall not exceed 0.01 lpm. This will cause a slight rise in PRESS./SUCTION manometer (4).

10. Close OUTPUT valve (C).

11. Back off LOW PRESS. REGULATOR (N).

12. Open system bleed valve(s) and bleed system.

Table 4-6. Troubleshooting (Flow Suction)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-10.		
Low suction.	Weak demand valve spring (60).	Replace demand valve spring (60).
	Weak injector spring (3, figure 4-13).	Replace injector spring (3, figure 4-13).
	Outlet screen out of position (23).	Realign screen (23).
	Low pressure reducer setting.	Reset to 48 ±1 psig.
	High pressure reducer setting.	
	Stiff demand valve spring (60).	Replace demand valve spring (60).
High suction.	Stiff injector spring (3, figure 4-13).	Replace injector spring (3, figure 4-13).
	Demand valve set too low.	Reset to 11/64 inch above case.
	Insufficient volume in pressure reducer (set too high).	Reset to 9/64 inch above surface to bellows cap.
	Low setting of diaphragm lever (72).	Readjust diaphragm lever screw (73).
	Pressure reducer creep.	Reset or replace inlet valve (13) and orifice.

4-66. OXYGEN RATIO TEST. To perform the Oxygen Ratio Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Ensure that regulator diluter knob is in the NORMAL position.

2. Turn test stand INLET. PRESS. ON/OFF valve (L) to the ON position.

3. Using LOW PRESS. REGULATOR (N), apply 150 psig to the regulator inlet.

CAUTION

Maintain 3.0 inH_2O in OUTPUT FLOW manometer (I) with OUTPUT valve (C) while ascending to altitude.

Slowly open VACUUM CONTROL valve (B) and observe PRESS./ SUCTION manometer (4). If rapid increase in pressure is indicated, close down on VACUUM CONTROL valve (B) until pressure stabilizes. Increase of pressure on PRESS./SUCTION manometer (4) is caused by too fast a rate of climb in the altitude chamber.

4. Using VACUUM CONTROL valve (B), ascend to first test altitude shown on Performance Test Sheet.

5. Set output flows specified in Performance Test Sheet with OUTPUT valve (C) and stabilize altitude with INPUT valve (A).

6. Read INPUT FLOW manometer (2) and record readings on the Performance Test Sheet.

7. Continue the test for each specified altitude and outlet flow shown on the Performance Test Sheet.

8. Close OUTPUT valve (C) and INPUT valve (A). Descend to 27,000 feet using valve (K).

NOTE

If indicated input flows are not within limits, an Aneroid Closure Test must be performed.

4-67. ANEROID CLOSURE TEST. To perform the Aneroid Closure Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

NOTE

The Aneroid Closure Test is performed only if regulator fails Oxygen Ratio Test.

1. Descend to 25,000 feet, using CHAMBER BLEED valve (K).

2. Ensure that inlet pressure is set at 150 psig.

3. Set up a flow of 3.0 inH_2O on OUTPUT FLOW manometer (1) with OUTPUT valve (C).

4. Aneroid shall close between 28,000 and 32,000 feet as indicated by no further advance in altitude on LOW RANGE ALTM. (13).

5. Close OUTPUT valve (C) and descend to sea level using CHAMBER BLEED valve (K).

6. If regulator fails Aneroid Closure Test and/or Oxygen Ratio Test, locate probable cause using trouble-shooting chart (table 4-7 or table 4-8).

4-68. REGULATOR OXYGEN PURGE. After completion of all tests, the regulator shall be purged with oxygen as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen	MIL-O-27210, Type 1
As Required	Bag, Plastic	MIL-B-117 (CAGE 81349)

WARNING

Do not use oxygen test stand to regulate the oxygen purge pressure.

1. Connect regulator inlet to a regulated source of aviator's breathing oxygen.

2. Apply 500 psig to regulator inlet.

3. Position air valve lever in the 100% position and depress diaphragm; allow oxygen to flow 1 to 3 minutes.

4. Shut off oxygen source and disconnect regulator.

NOTE

Upon completion of the bench test and/or Calendar Inspection, the organizational custodian shall retain the appropriate forms in accordance with OPNAVINST 4790.2 Series. All equipment forwarded from the Organizational Level maintenance to the intermediate and/or Depot Level, shall be accompanied by the appropriate forms in accordance with OPNAVINST 4790.2 Series. The test stand operator and CDI shall sign the Performance Test Sheet, and the original or a copy shall be forwarded to the organizational custodian.

5. After completion of oxygen purge, place oxygen regulator in plastic bag for storage.

Table 4-7. Troubleshooting (Oxygen Ratio)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-16.		
High air at 10,000 feet.	Weak air check valve spring (10).	Replace with stronger air check valve spring (10).
Low air at 10,000 feet.	Strong air check valve spring (10).	Replace with weaker air check valve spring (10).
	Leaking injector.	Tighten venturi (mixing tube) (26, figure 4-10.) Replace injector seat (5, figure 4-13) and/or injector washer (7, figure 4-13) as required.
High air at 20,000 feet.	Excessive throttling plate movement. Throttling plate too far from housing seat.	Replace plate retaining nut (3) with one having a longer shoulder.
Low air at 20,000 feet.	Throttling plate too close to housing seat.	Replace plate retaining nut (3) with one having a shorter shoulder.
	Leaking injector.	Tighten venturi (mixing tube) (26, figure 4-10) or replace injector washer (7, figure 4-13).
High air at 28,000 feet.	Aneroid air valve closure too high.	Readjust aneroid to close at 28,000 to 32,000 feet.
Low air at 28,000 feet.	Aneroid air valve close too low.	Readjust aneroid to close at 28,000 to 32,000 feet.
	Air check valve spring (10) too strong.	Replace with weaker air check valve spring (10).

Table 4-8. Troubleshooting (Aneroid Closure)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-16.		
Aneroid not closing at 32,000 feet.	Cocked aneroid (1).	Replace aneroid (1).
	Scored or dirty throttling plate/seat.	Polish with 4/0 polishing paper. Clean with no flash cleaning compound and blow dry using nitrogen (BB-N-411). If plate/seat is scored too deeply, replace as required.
Aneroid closing too soon.	Aneroid and throttling plate set too close to seat.	Loosen locknut (6) and turn aneroid threaded stem (1) counterclockwise (1/4 turn equals approx. 2,000 feet).
Aneroid closing too late.	Aneroid and throttling plate set too far from seat.	Loosen locknut (6) and turn the aneroid threaded stem (1) clockwise (ideal aneroid closure is 30,000 feet).

4-69. DISASSEMBLY.

4-70. Disassemble the oxygen regulator using the index numbers assigned to figure 4-10, unless otherwise noted. Disassemble the regulator only as far as required to correct any malfunctions.

CAUTION

All disassembly, inspection, repair, and assembly must be done on benches having good lighting and in an area provided with air conditioning or air filtering. Walls, floor, and ceiling should have a smooth finish and be painted with a non-chalking paint which can be kept clean and dust free. It is desirable to keep all parts for each individual regulator separated. Make careful note of the location and quantity of all parts. Plastic partitioned boxes with covers or similar storage facilities should be used to keep the parts segregated and protected from dirt and moisture. Plastic bags are also useful for storing subassemblies and component parts after cleaning and inspection until ready for assembly.

4-71. REQUIRED SPECIAL TOOLS. Figure 4-5 and table 4-9 list special tools and test equipment required in connection with the work prescribed for disassembly and assembly procedures.

NOTE

Special tools shown in figure 4-5 shall be locally manufactured.

4-72. REMOVAL OF EMERGENCY VALVE ASSEMBLY. To remove the emergency valve assembly, proceed as follows:

1. Remove tee (4, figure 4-10) and emergency gage (1) as one unit, by removing four screws (6) and four lockwashers (7), and carefully separate the emergency valve assembly (5).

2. Remove shipping plug (8) if provided.

CAUTION

Care must be used to avoid dropping inlet valve and insert assembly which rests inside the emergency valve.

Use extreme care when handing inlet valve (13). It must be kept smooth, flat, and free from nicks.

NOTE

Inlet valve and insert assembly (1, figure 4-17) and its mating part inlet orifice, (2, figure 4-17), are NOT interchangeable with the same parts of other regulators. They MUST be released as a MATCHED set.

3. Lift inlet valve and insert assembly (13, figure 4-10) out of emergency valve assembly (5).

4. Loosen nut (14) and remove screw (15) from inlet valve.

5. Remove oxygen inlet gasket (16).

4-73. EMERGENCY VALVE ASSEMBLY. To disassemble the emergency valve assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Nut, Orifice	Fabricate IAW figure 4-5

NOTE

Inlet valve and insert assembly (1, figure 4-17) and its mating part inlet orifice, (2, figure 4-17), are NOT interchangeable with the same parts of other regulators. They MUST be released as a MATCHED set.

1. Remove screen and retainer assembly (2, figure 4-14) from emergency valve body (1). It will be necessary to distort the retainer and screen in order to remove it. Use a new one upon reassembly.

2. Remove orifice nut (3) with orifice nut wrench. Lightly tap emergency valve body (1) to free inlet orifice (4). Remove gasket (5).

NOTE

Do NOT attempt to remove the ball and spacer from emergency valve shaft. If either part is damaged, replace emergency valve shaft assembly.

3. Unscrew stuffing box nut (7) and unscrew emergency valve shaft assembly (6) from emergency valve body (1).

4. Remove washer (8) and packing (9) from emergency valve body (1).

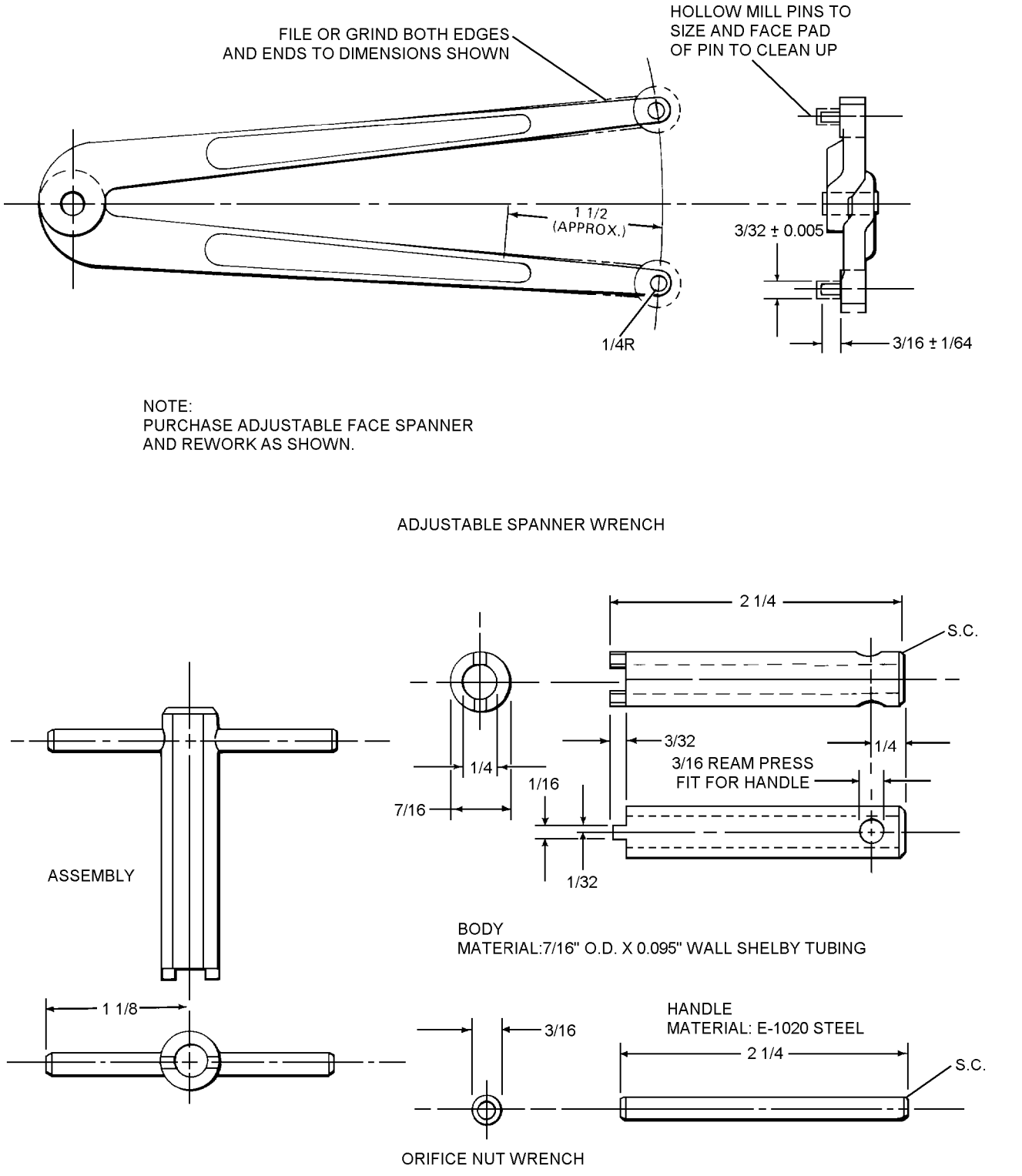
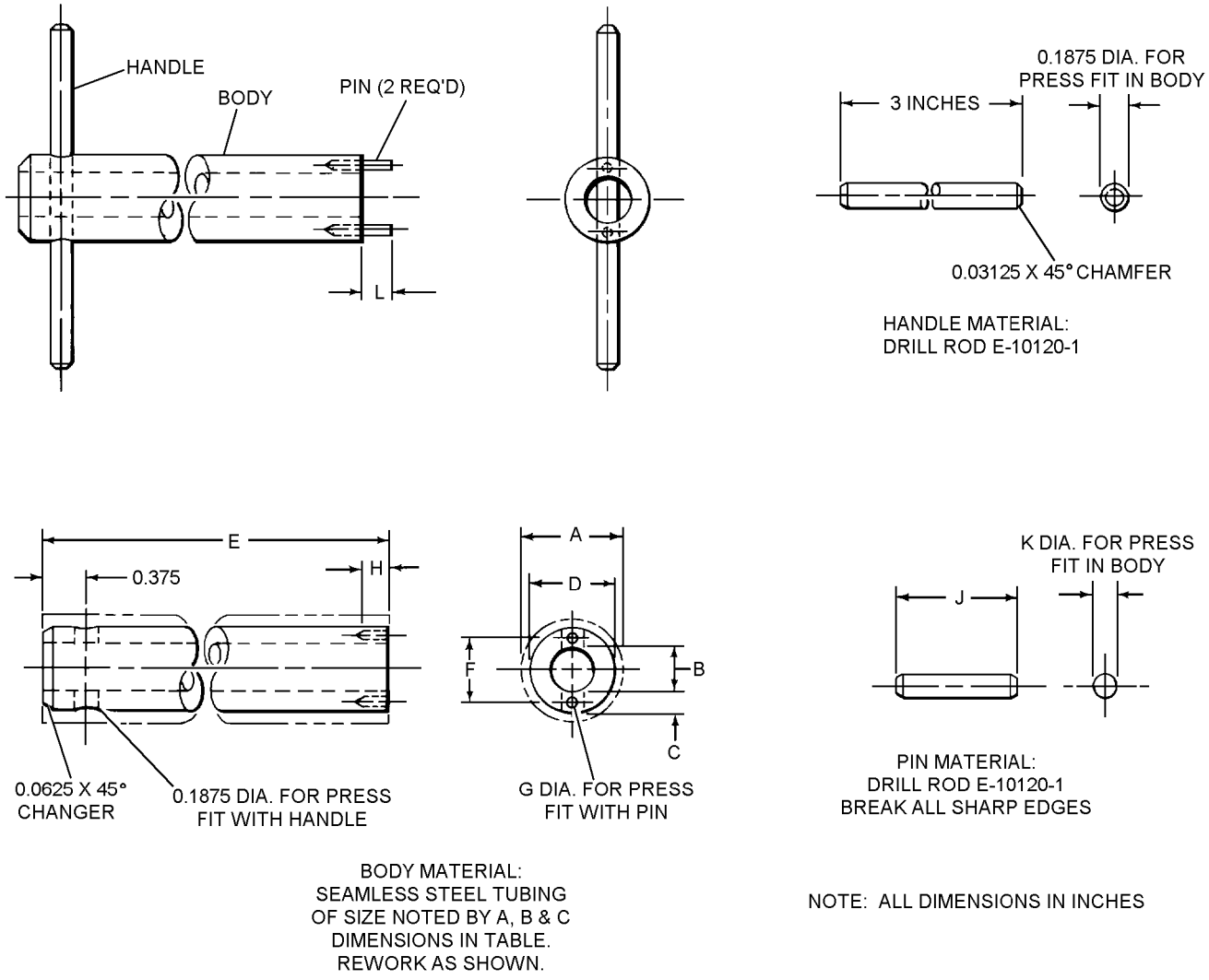


Figure 4-5. Special Tools and Test Equipment (Sheet 1 of 3)



FIXED SPANNER WRENCH (THREE SIZES REQUIRED)

	A	B	C	D	E	F	G	H	J	K	L
SIZE 1	0.750	0.437	0.156	0.750	3.5	±0.003 0.578	±0.001 0.062	0.187	0.343	±0.001 0.060	0.156
SIZE 2	0.8125	0.544 to 0.219	0.134 to 0.219	0.790	3.5	±0.002 0.675	±0.001 0.055	0.187	0.250	±0.001 0.055	0.062
SIZE 3	0.5625	0.187	0.187	0.5625	3.5	0.343	±0.001 0.070	0.187	0.234	±0.001 0.070	0.047

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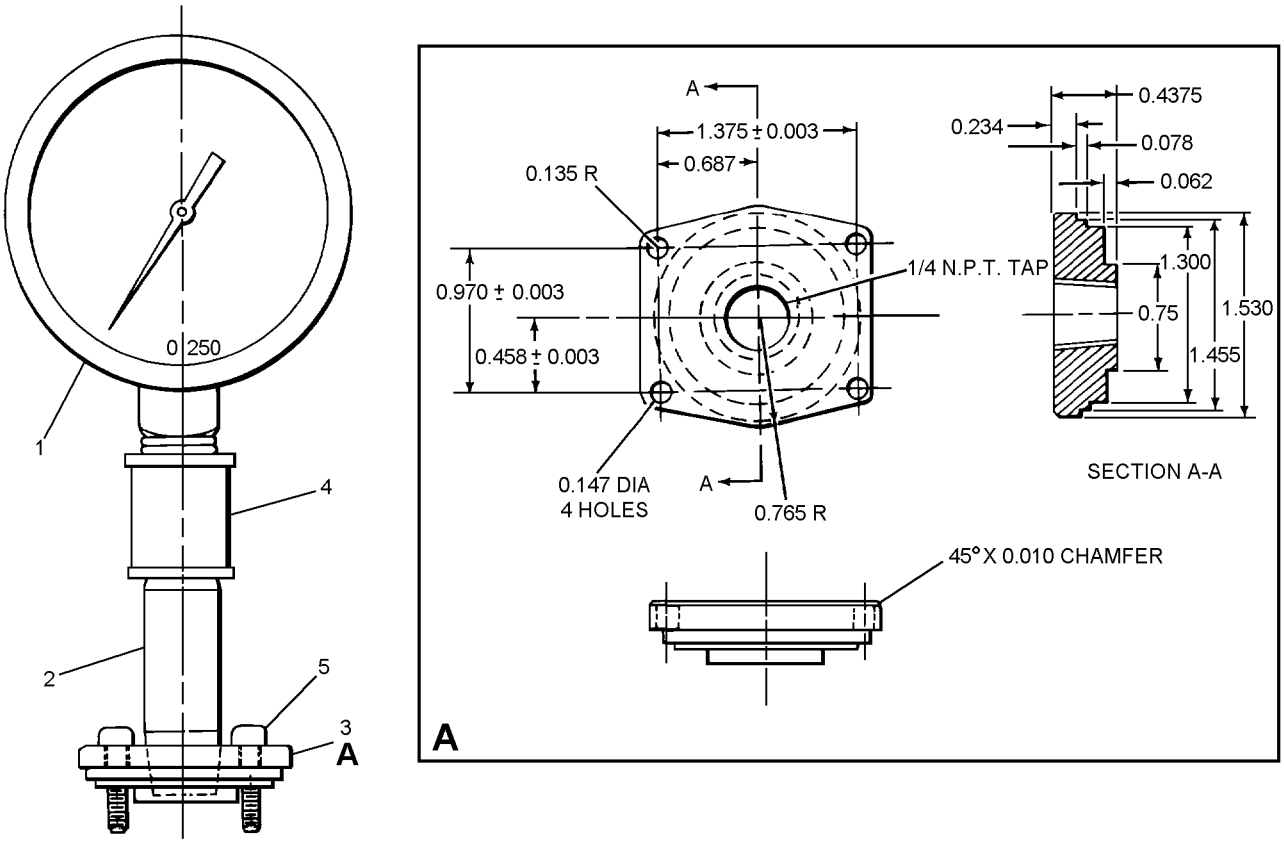
Figure 4-5. Special Tools and Test Equipment (Sheet 2 of 3)



PRESSURE GAGE TEST FIXTURE

ITEM NO.	DESCRIPTION	REFERENCE NUMBER	ASSEMBLY INSTRUCTIONS
1	250 PSI Oxygen Gage	F340-1017-4 (CAGE 97413) NIIN 00-056-9546	Anti-seize tape required
2	1/4 x 2 Inch Brass Pipe Nipple	NIIN 00-196-1972	Anti-seize tape required at both ends
3	Relief Valve Adapter	Fabricate in accordance with Detail A	–
4	1/4 Inch Brass Pipe Coupling	NIIN 00-187-7647	–
5	Cap screw, Socket Head Hexagon, Corrosion Resistant Steel, UNC-3A 1/2 Inch 4-40	MS-16995	4 required (7/64 inch allen wrench)
Notes: 1. After assembly, wash twice with cleaning compound MIL-C-81302 and air dry. Ensure that all oil has been removed.			

00400503

Figure 4-5. Special Tools and Test Equipment (Sheet 3 of 3)

Table 4-9. Special Tools and Test Equipment List

Nomenclature	Application	Figure
Adjustable Spanner Wrench	Disassembly and reassembly of check valve and aneroid assembly.	4-5
Orifice Nut Wrench	Disassembly and reassembly of nut.	4-5
Fixed Pin Spanner Wrench (Note 1)	Adjustment of relief valve guide.	4-5
Pressure Gage Test Fixture	Adjustment of pressure reducer assembly; calibration of relief valve.	4-5
Spanner Wrench (Note 2)	Disassembly and reassembly of flow indicator.	Not Shown

Notes: 1. The fixed pin spanner wrench has three required sizes.
2. Procured from manufacturer (CAGE 19315) NIIN 00-094-8936.

4-74. ELBOW ASSEMBLY. To remove and disassemble elbow assembly, proceed as follows:

1. Unscrew elbow nut (21, figure 4-10) and remove elbow (22) and baffle (23).

2. Using a pair of tweezers, remove gasket (24).

NOTE

Baffle plate is soldered to elbow screen and further disassembly must not be undertaken. Damage or wear to either part necessitates replacing elbow screen.

3. Slide a finger through elbow (22) and push elbow screen and baffle (23) out of elbow.

4-75. INJECTOR ASSEMBLY. To remove injection assembly, proceed as follows:

1. Remove lock spring (25, figure 4-10) from venturi (26), using needle nose pliers.

2. Unscrew venturi (26) from case (76), using a wide bladed screwdriver.

3. Extract injector assembly (27), being careful not to mar injector assembly surface.

4-76. DISASSEMBLY OF INJECTOR ASSEMBLY. To disassemble injector assembly, proceed as follows:

CAUTION

Extreme care must be used in handling injector nozzle and injector seat. The contact surface of each must be smooth, flat, and free from nicks.

1. Remove washer (7, figure 4-13) that rests on injector seat (5), using tweezers.

2. Carefully release injector snap ring (6) and remove, using jeweler screwdriver.

3. Remove injector seat (5).

4. Tip injector housing (1) so injector nozzle (4), dampener spring (2), and injector spring (3) will drop out.

4-77. AIR VALVE ASSEMBLY. To remove air valve assembly, proceed as follows:

1. Remove four screws (18, figure 4-10). Remove body and cover assembly (17).

NOTE

Do NOT remove locating pin (77) unless it requires replacement.

2. Lift out check valve and aneroid assembly (20) with gasket (19). Remove gasket.

4-78. AIR VALVE BODY AND COVER ASSEMBLY. To disassemble air valve body and cover assembly, proceed as follows:

NOTE

Damage to either part will require replacement with a new assembly.

1. Remove screw (5, figure 4-15), lockwasher (6), cover assembly (1), spring retainer (7), and spring (8).

2. Remove screen (3).

3. Remove gasket (10) from air valve cover assembly (1). Further disassembly of air valve cover assembly must NOT be undertaken.

4. If necessary for replacement, pry loose air valve body gasket (9) from underside of air valve body (4).

4-79. AIR CHECK VALVE AND ANEROID ASSEMBLY. To disassemble air check valve and aneroid assembly, proceed as follows.

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner, Adjustable	Fabricate IAW figure 4-5

CAUTION

Extreme care must be used in handing check valve seat. The surface making contact with the throttling plate (2) is critical and must NOT be marred or scratched.

1. Slightly spread prongs of air check valve retainer (9, figure 4-16) and separate it from check valve seat (7).

2. Air check valve spring (10) and check valve disc (8) will come off with check valve retainer. Carefully separate them from air check valve retainer (9).

NOTE

Do NOT change adjustment or disassemble the aneroid (1), flange (5) or throttling plate (2) unless it is necessary to replace a damaged part. Disassembly requires recalibration of the assembly.

3. Using adjustable spanner wrench unscrew air valve flange (5) from check valve seat (7).

4. If it is necessary to disassemble the aneroid assembly further, proceed as follows:

a. Remove plate retaining nut (3) and lift throttling plate (2) and spring washer (4) from aneroid assembly (1).

NOTE

Damage or wear to any of the parts will necessitate replacement of aneroid assembly.

b. Unscrew two nuts (3 and 6) and air valve flange (5) from aneroid assembly (1). The aneroid syphon top, aneroid syphon bottom, and evacuation tube are soldered to the aneroid bellows; do not disassemble any further.

4-80. COVER ASSEMBLY, BOTTOM PLATE, AND DIAPHRAGM ASSEMBLY. To remove cover assembly, bottom plate, and diaphragm assembly, proceed as follows:

NOTE

For disassembly of the 2858-B1 and 2858-C1 cover assembly, do NOT separate dial (56, figure 4-10) which is riveted to cover (57) unless it is necessary and disassembly is required (figure 4-11).

1. Remove six diaphragm screws (37, figure 4-10), six bottom plate screws (35), and lift bottom plate (34) and bottom plate gasket (38) from case (76).

2. Remove four screws (54) and lift cover assembly (57) off regulator case (76).

NOTE

Damage to diaphragm will necessitate replacement of diaphragm assembly. Older models may have diaphragm knob (53), nut (52), washer (51), and lower disc (49) cemented in place, and may be damaged during disassembly which will necessitate replacement.

3. Unscrew diaphragm knob (53) and remove nut (52), using 3/16-inch wrench.

4. Lift off diaphragm washer (51) and diaphragm assembly (36).

5. Remove diaphragm ring gasket (50).

6. Slide lower disc (49) off diaphragm.

4-81. REMOVAL AND DISASSEMBLY OF DIAPHRAGM LEVER AND BRACKET ASSEMBLY. To remove and disassemble diaphragm lever and bracket assembly, proceed as follows:

1. Remove two screws (68, figure 4-10) and remove bracket and bushing assembly (69 and 70) with diaphragm lever assembly (72 through 75) attached.

2. Remove gasket (66) and lift demand valve stem (67) out.

NOTE

The bushing is a tight press fit in the bracket and disassembly must NOT be undertaken. Damage or wear to either part will necessitate replacement of bracket assembly.

3. If necessary for replacement purposes, the diaphragm lever assembly may be disassembled as follows:

a. Remove pin (75) and separate diaphragm link (74) from diaphragm lever (72).

b. Remove setscrew (73) from diaphragm lever (72).

4-82. REMOVAL OF RELIEF VALVE ASSEMBLY AND DEMAND VALVE. To remove relief valve assembly and demand valve, proceed as follows:

NOTE

The relief valve assembly requires separate calibration and special test equipment. The guide may be cemented into the top cover at the factory. The guide must not be loosened or adjusted except at depot level repair. Damage or wear to any part of the assembly will necessitate replacement of the relief valve assembly.

1. Remove four screws (48, figure 4-10) and lift out relief valve assembly (47) and gasket (46).

CAUTION

Some models do NOT have a bellows dampener (45). In order to prevent excessive vibration and oxygen leakage at low temperatures, this part must be used upon reassembly, if available.

2. Carefully remove bellows dampener (45) from around pressure reducer bellows (39).

3. Remove two screws (59) and lift low pressure cap (58) and gasket (63) from demand valve chamber.

4. Remove demand valve spring (60) and demand valve seat holder (62) with demand valve seat (61).

5. Lightly push demand valve (64) out of case (76), being careful NOT to damage the demand valve.

6. Remove gasket (65).

4-83. REMOVAL OF FLOW INDICATOR. To remove the flow indicator, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner, Adjustable	Fabricate IAW figure 4-5

NOTE

Do not remove screen (33, figure 4-10) unless necessary for replacement purposes.

1. Remove flow indicator (28, figure 4-10), extension (29), elbow (31), and flow indicator screen (33).

NOTE

On flow indicator P/N AN6029-1, an extension elbow (30) is used in place of the straight extension (29).

2. For further disassembly of flow indicator, proceed as follows:

a. Remove four screws (3, figure 4-18), bezel (2), glass (4), gasket (5) and dial (6).

b. Using spanner wrench, remove retaining ring (7) and ring (8).

c. Carefully remove entire blinker assembly, consisting of washer packing (9), lever and plate assembly (10), frame (17), and piston seal (22).

NOTE

Further disassembly shall be performed by depot level only.

4-84. PRESSURE REDUCER ASSEMBLY. To disassemble the pressure reducer assembly, proceed as follows:

1. Remove four screws (40, figure 4-10) and remove the pressure reducer assembly (39) from the case.

2. Remove gasket (44).

NOTE

Do not disassemble the pressure reducer assembly further if repairs are required. Replace entire assembly; adjustment is authorized.

4-85. CLEANING. To clean the disassembled oxygen regulator body and component parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Bag, Plastic	MIL-B-117 (CAGE 81349)
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen equipment. Oil, even in a minute quantity, coming in contact with oxygen, can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous.

1. Clean all metallic parts in accordance with NAVAIR 13-1-6.4-1.

WARNING

Do not attempt to clean any elastomer parts that have become contaminated with oil or grease. All such parts shall be replaced.

2. Prior to installation, wash all silicone-rubber parts in distilled water and blow dry with oil-free nitrogen.

3. After cleaning, all internal surfaces shall be examined for cleanliness. Should further contamination be found, reclean the parts in accordance with step 1.

4. Cleaned parts shall be sealed in plastic bags for storage. Bag all complete assemblies that are not immediately returned to service.

4-86. INSPECTION OF DISASSEMBLED REGULATOR.

4-87. Inspect the disassembled regulator body and component parts in accordance with the special instructions in table 4-10.

4-88. REPAIR.

Materials Required

Quantity	Description	Reference Number
As Required	Lacquer, White	MIL-L-6805

4-89. Unless otherwise specified, all parts found to be damaged or defective shall be replaced. Defects on white painted surfaces may be touched up using lacquer.

4-90. ASSEMBLY.

4-91. Assembly of aircraft panel mounted regulators is essentially the reverse of disassembly. Tests are required on subassemblies as they are assembled into the regulator. Adjustment and calibration are also performed at time of assembly.

4-92. REQUIRED SPECIAL TOOLS. Figure 4-5 and table 4-9 list special tools and test equipment required in connection with the work prescribed for disassembly and assembly procedures.

NOTE

Special tools shown in figure 4-5 shall be locally manufactured.

CAUTION

Use extreme care in fitting precision parts to prevent damage. Ensure that each component is dust- and dirt-free.

NOTE

All silicone-rubber parts shall be discarded and replaced with new items at the time of assembly. They shall be washed in accordance with paragraph 4-85, step 2, prior to installation.

4-93. Assembly is effected in two separate operations; assembly of components into subassemblies and assembly of the subassemblies into the regulator housing.

4-94. EMERGENCY VALVE. To assemble the emergency valve, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240AC, Type III, Lubricant	MIL-G-27617 NIIN 00-961-8995
As Required	Tape, Anti-seize	MIL-T-27730

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Nut, Orifice	Fabricate IAW figure 4-5

Table 4-10. Inspection of Disassembled Regulator

Nomenclature	Figure and Index	Inspect For
Oxygen Inlet Orifice.	4-14-1	Wear or damage; surfaces must be smooth, flat and free of nicks.
		Mirror finish on orifice cone (polish with jeweler's rouge).
Inlet Valve and Insert Assembly.	4-10-13, -14 and -15	Smooth, flat, free from nicks, burrs and ripples.
Throttling Plate.	4-16-2	Smooth, flat and free of nicks.
Injector Seat and Nozzle.	4-13-4 and -5	Smooth and free from nicks and burrs.
Damping Spring.	4-13-2	Tension prongs must not be cocked or under uneven tension.
Pressure Reducer Bellows.	4-12-1	Distortion, dents or leaks.
Diaphragm Assembly.	4-10-36	Cracks, tears, wrinkles, or excessive wear. Diaphragm tightness on ring (must not rotate with hand pressure). Diaphragm detent (place lower disc on top and apply pressure; fabric must be flush or 1/16 inch below bottom edge.)
Demand Valve Stem.	4-10-67	Free operation.
Screens.	4-10-23 and -33	Clogged screens (blow out with compressed air).
Case.	4-10-76 and -77	Clogged passages, dents, cracks, or distortion.
Springs.	4-10-42 and -60 4-13-3 4-15-8 4-16-10	Damage or distortion.
Cover Assembly.	4-10-55, -56 and -57	Sharp edges, flush rivets, and smooth inner surfaces.
Flow Indicator.	4-10-28	Dents and distortion.
Diaphragm Lever Assembly.	4-10-72, -73, -74 and -75	Wear (must be smooth and without burrs).
Air Check Valve Discs.	4-16-8	Smooth (flat and free of nicks).
Air Check Valve Seat.	4-16-7	Smooth (flat and free of nicks and wear).

NOTE

Before beginning the assembly of the emergency valve assembly, be sure that ONLY emergency valve (Pioneer Type PB51693-2) is used. If the oxygen inlet orifice requires replacement, replace both the orifice and inlet valve as a matched assembly.

1. Insert gasket (5, figure 4-14) into emergency valve body (1) as far as it will go.

2. Place oxygen inlet orifice (4) wide end first next to the gasket.

3. Using orifice nut wrench screw orifice nut (3) into emergency valve body (1) to secure orifice in position.

4. Insert a new retainer and screen assembly (2) into position in the emergency valve body (1).

5. Apply a small amount of lubricant (Krytox 240 AC) to the first two threads of the emergency valve shaft (6), washer (8) and four packings (9).

6. Place stuffing box nut (7), washer (8) and four packings (9) on emergency valve shaft assembly (6), and screw shaft into emergency valve body (1). Tighten the shaft in the body until the ball in the shaft seats itself over the orifice in the body. Tighten stuffing box nut (7) into body sufficiently to prevent shaft (6) from being turned freely.

7. Fit oxygen inlet gasket (16, figure 4-10) over emergency valve body (5) and position body on case (76) so that the emergency valve shaft is on the top of the case (oxygen emergency valve bypass hole is in top side of case).

8. Secure emergency valve assembly (5) to case (76) with four screws (6) and lockwashers (7).

9. Wrap pipe threads of inlet tee (4) with two turns of anti-seize tape and install tee (4) into emergency valve assembly (5).

10. Wrap threads of pressure gage (1) with two turns of anti-seize tape and install into tee (4).

4-95. DEMAND VALVE. To assemble the demand valve, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC, Type III, Lubricant	MIL-G-27617 NIIN 00-961-8995

NOTE

Demand valve (64, figure 4-10) has four holes spaced evenly around the large end. Seat the valve in the demand chamber so that one of these holes is opposite the diagonal hole in the case.

There are three gaskets used in the demand valve assembly, two thin ones (65) and one thick one (63).The thick one (63) is used on the low pressure valve cap (58).

1. Slip gasket (65, figure 4-10) over shoulder of small end of demand valve (64) and place it, gasket side down, in the demand valve chamber. Ensure that it is seated as deeply as possible.

NOTE

Use new seat and holder assembly when reassembling. If not available, use extreme care to avoid damage to valve seat holder when prying valve seat out of valve seat holder. Reinsert valve seat with reverse side up.

2. Place a dot of Krytox 240 AC lubricant in center of demand valve holder (62) and install demand valve seat (61).

3. Insert demand valve holder (62) and demand valve seat (61) into demand valve chamber, position seat down, and center on demand valve (64).

NOTE

The demand valve (64) and injector springs (60) are similar in appearance. THEY ARE NOT INTERCHANGEABLE. The injector spring can be identified by the tension, which is slightly stronger than the demand valve spring (figure 4-6).

4. Place demand valve spring (60, figure 4-10) over demand valve holder (62). Place gasket (63) on low pressure valve cap (58).

5. Gently place low pressure valve cap (58) on demand valve holder (62). Press lightly and ensure alignment of cap and demand valve holder.

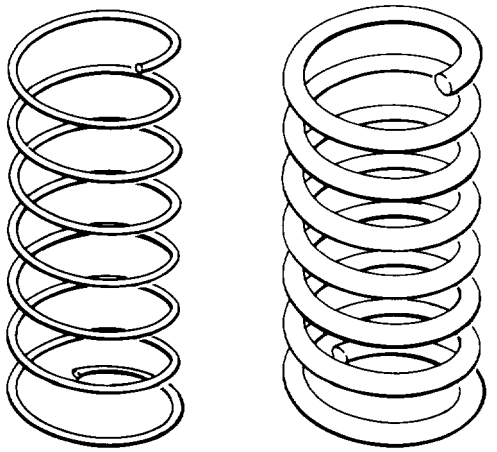


Figure 4-6. Difference Between Demand Valve/Injector Springs

NOTE

Carefully tighten screws evenly to prevent cocking the valve seat holder and thereby damaging the valve seat.

6. Secure valve cap (58) to case (76) with two screws.

4-96. DIAPHRAGM LEVER AND BRACKET ASSEMBLY. To assemble the diaphragm lever and bracket assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Polishing Paper 4/0	C135E (CAGE 10646)

Support Equipment Required

Quantity	Description	Reference Number
1	Gage, Height	Fabricate IAW figure 4-7
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100
1	Straightedge	—

1. Polish the small diameter end of the demand valve stem (67, figure 4-10) with 4/0 polishing paper. Wash thoroughly and clean component in accordance with NAVAIR 13-1-6.4-1.

2. Check operation of the demand valve stem (67) in the bracket and bushing assembly (70 and 69) to ensure that it operates freely and does not bind. If it binds in the bushing (69), replace the demand valve stem (67).

NOTE

The side play between the diaphragm lever (72) and the diaphragm lever bracket (70) is to prevent sticking in the event of frost.

Use Allen wrench when tightening diaphragm lever set screw (73).

3. Place gasket (66) on shoulder of case (76) over demand valve orifice.

4. Place demand valve stem (67) in demand valve (64) with flanged end on top of valve seat (61).

5. Slide protruding end of demand valve stem (67) into bushing (69) in bracket (70) and secure bracket and bushing assembly to case (76) with two screws (68).

6. Connect regulator inlet to test stand N_2 INPUT connection 18 in altitude chamber.

7. Turn INLET PRESS. ON/OFF valve (L) to ON slowly.

8. Using LOW PRESS. REGULATOR (N), adjust input pressure to 100 psig.

9. Using an Allen wrench, loosen setscrew (73) and with 100-psig inlet pressure applied, adjust the height of the diaphragm lever (72) by means of the setscrew (73).

10. The height of the diaphragm lever (72) is adjusted so that the highest point of the diaphragm lever, with the link (74) hanging down vertically, is 11/64 inch above the top edge of the regulator case (76).

NOTE

The lever adjustment is critical and may be determined with a scale and straightedge, as shown in figure 4-7(A), or by using a height gage, figure 4-7(B). The height gage is made from aluminum or steel and may be locally manufactured.

11. When using the height gage, lay it across the regulator case (76) and adjust the setscrew (73) so that the diaphragm lever (72) just touches the top of the 11/64-inch slot.

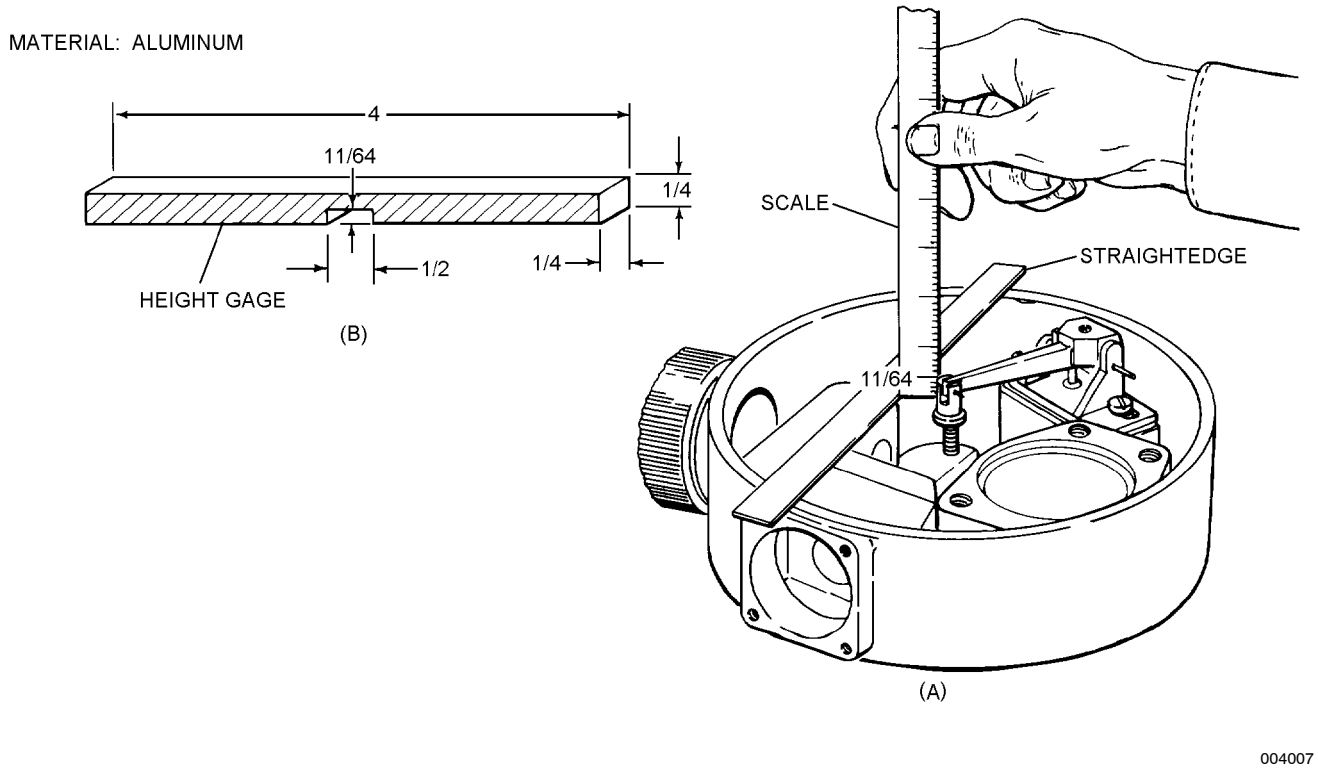


Figure 4-7. Adjustment of Diaphragm Lever

12. After the diaphragm lever (72) is properly adjusted, is should be checked for freedom of movement. Sluggishness is a sign of friction and must be corrected.

4-97. ASSEMBLY OF ELBOW ASSEMBLY. To assemble the elbow assembly, proceed as follows:

1. Slightly bend elbow screen and insert it into wide end of elbow (22, figure 4-10) so baffle plate (23) will be nearest venturi (26) when assembled.

2. Slide elbow (22) through elbow nut (21) and insert new gasket (24) in nut against elbow, securing them together.

3. Screw elbow nut (21) onto venturi outlet in case (76).

4-98. TESTING AND ADJUSTING RELIEF VALVE ASSEMBLY. To test and adjust the relief valve assembly, proceed as follows:

WARNING

Soap solution or leak detection compound should not be used during this test as the presence of water vapor in the relief valve assembly may result in faulty operation.

Materials Required

Quantity	Description	Reference Number
As Required	Glyptal	1201B (CAGE 24452)
As Required	Heater hose, 3/4-Inch ID	Commercial
2	Hose Clamp, 1 to 1 1/2-Inch ID	Commercial
As Required	Plug	NAVAIR Dwg 11725-142

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100
1	Pressure Gage Test Fixture	Fabricated IAW figure 4-5
1	Wrench, Spanner, Fixed Pin, Size 3	Fabricated IAW figure 4-5

1. Insert gasket (46, figure 4-10) into regulator case (76).

2. Install relief valve assembly (47) and secure with four screws (48).

3. Install 3-inch length of 3/4-inch ID heater hose over elbow (22) outlet and secure using hose clamp. Insert plug (DWG no. NAVAIR 11725-142) and secure with hose clamp.

4. Insert gasket (44) into regulator case (76). Install pressure gage test fixture and secure with four screws provided with fixture.

5. Connect regulator to test stand N_2 INPUT connection 18. Open INLET PRESS. ON/OFF valve (L).

6. Apply 160 psig, using LOW PRESS. REGULATOR (N); relief valve shall be fully open.

7. Close INLET PRESS. ON/OFF valve and observe pressure gage test fixture.

CAUTION

Prior to relief valve adjustment, use acetone to dissolve Glyptal from relief valve guide. Use extreme care to prevent acetone from contacting relief valve seat (figure 4-8).

NOTE

Relief valve test pressure shall drop to 65 ±5 psig and shall remain leak tight.

8. Relief valve shall be fully open at 160 psig and leak tight at 65 ±5 psig. If not, adjust relief valve, using fixed pin spanner wrench, size 3.

9. If pressures fall within tolerances, proceed to step 10. If not, proceed as follows:

a. If test pressure falls below 65 ±5 psig tolerance, rotate relief valve guide clockwise and repeat steps 6 through 9.

b. If test pressure does not drop to 65 ±5 psig, rotate relief valve guide counter-clockwise and repeat steps 6 through 9.

10. Apply Glyptal dot to relief valve guide. Ensure that dot covers both guide and body (figure 4-8).

11. Bleed test pressure from pressure reducing valve chamber by gently depressing demand valve lever (72, figure 4-10).

12. Remove hose, two clamps, and plug from elbow assembly and remove elbow assembly.

13. Back out LOW PRESS. REGULATOR (N) and bleed pressure, using SYSTEM BLEED valve (S).

14. Disconnect regulator from N_2 INPUT connection 18 and remove regulator from test stand.

15. Remove four screws provided with fixture and remove pressure gage test fixture.

16. Remove four screws (48) and remove relief valve assembly (47).

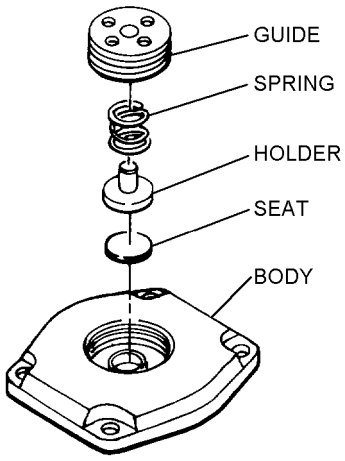


Figure 4-8. Relief Valve Assembly

4-99. INLET VALVE. To assemble the inlet valve, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Micrometer	—
1	Straightedge	—

1. Install nut (14, figure 4-10) to screw (15).

NOTE

Using a micrometer, adjust screw so the distance from the front face to screw head is 0.519 inch. Lock screw into place by tightening nut. If a micrometer is not available, use machinist rule and adjust to 33/64 inch.

2. Install screw into inlet valve and insert assembly (13).

3. Install inlet valve and insert assembly (13) into emergency valve assembly (5).

4. Holding valve by screw, insert inlet valve through pressure reducer chamber into emergency valve assembly (5) so the center drill hole is aligned with oxygen inlet orifice.

4-100. PRESSURE REDUCER ASSEMBLY. To assemble the pressure reducer assembly, proceed as follows:

NOTE

Repairs to the pressure reducer are not authorized.

1. Invert regulator case (76, figure 4-10). Install gasket (44) on rim of pressure reducer chamber.

2. Place pressure reducer in bottom of the pressure reducer chamber in such a manner that the short leg of the pressure reducer lever (3, figure 4-12) is aligned against the inlet valve screw (15, figure 4-10).

3. Secure the pressure reducer assembly (39) to the regulator case (76) using four screws (40).

4. Turn regulator case right side up.

4-101. Adjustment of the Pressure Reducer Assembly. To adjust the pressure reducer assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100
1	Pressure Gage Test Fixture	Fabricated IAW figure 4-5

1. Place the pressure reducer bellows dampener (45, figure 4-10) around the pressure reducer bellows (figure 4-9).

2. Place gasket (46, figure 4-10) in rim of pressure reducer chamber case (76).

3. Install pressure gage test fixture and secure in place using four screws (48).

4. Connect regulator to test stand N_2 INPUT connection (18). Open INLET PRESS. ON/OFF valve (L).

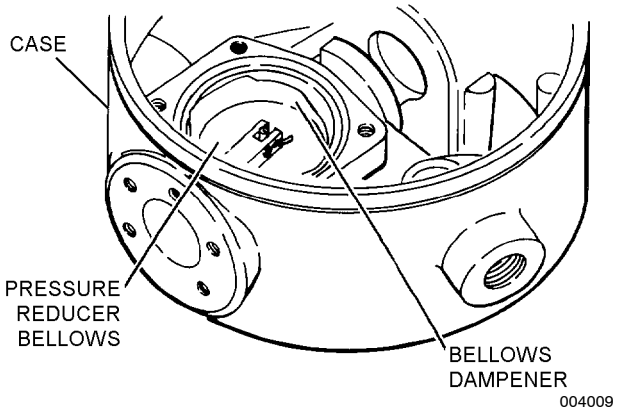


Figure 4-9. Positioning of Bellows Dampener in Pressure Reducer Assembly

5. Apply 100 psig, using LOW PRESS. REGULATOR (N), to the regulator inlet tee (4, figure 4-10).

6. Adjust the inlet valve screw (15) so that the pressure gage reads 48 ±1 psig. If pressure is not within tolerance, locate probable cause using troubleshooting chart (table 4-11).

7. After the pressure reducer (39) has been set at 48 ±1 psig, open the demand valve by depressing the diaphragm valve lever (72).

8. Allow the demand valve to close.

9. Note thse pressure on the test fixture pressure gage when the flow ceases. The pressure shall not increase more than 3 psig. If the pressure creeps, locate probable cause using troubleshooting chart (table 4-11).

10. Check the pressure reducer assembly (39) for vibration by opening and closing the demand valve several times.

11. Close N_2 supply cylinder valve. Using LOW PRESS. REGULATOR (N) and SYSTEM BLEED valve (S), relieve all pressure in the test stand. Secure all test stand valves.

12. Disconnect regulator from test stand N_2, INPUT connection (18).

13. Remove pressure gage test fixture.

14. Ensure that gasket (46) is still securely seated in rim of pressure reducer chamber case (76).

15. Install relief valve assembly (47), and secure with four screws (48).

4-102. INJECTOR ASSEMBLY. To assemble the injector assembly, proceed as follows:

NOTE

The demand valve and injector springs are very similar in appearance. THEY ARE NOT INTERCHANGEABLE. The injector spring can be identified by the tension, which is slightly stronger than the demand valve spring (figure 4-6).

1. Slide injector spring (3, figure 4-13) over injector nozzle (4).

2. Place damping spring (2) over sloped end of the injector nozzle (4), so that the prongs of the spring slide between injector nozzle (4) and injector spring (3).

3. Place injector nozzle (4), with injector spring (3) and dampening spring (2) into injector housing (1).

NOTE

Use extreme care in handing the injector seat. The valve seat surface must be smooth, flat and free of nicks to provide a perfect fit with the injector nozzle.

4. Place injector seat (5) over the injector nozzle (4), with the beveled surface of the seat next to the injector nozzle.

5. Hold down the injector seat (5), compressing the injector spring (3), and insert the injector snap ring (6) in the groove in the injector housing (1). Install washer (7).

6. Slide the washer end of the injector assembly (27, figure 4-10) into the regulator case (76) through the regulator outlet orifice.

7. Using a wide bladed screwdriver, screw the venturi (26) over the injector assembly (27) into the case (76), thereby securing the injector assembly in place.

8. Press the lock spring (25) over the slotted end of the venturi (26) until the last coil, with the bent end, is outboard and even with the venturi slots.

9. Lock the spring (25) to the case (76) by bending the end of the spring, using needle nose pliers, until it grips against the casting or the case.

4-103. CHECKING THE INJECTOR ASSEMBLY. To check the injector assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
1	Oxygen Gage, 0-60 psi	—

Table 4-11. Troubleshooting (Pressure Reducer)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-10.		
Test pressure below 48 ±1 psig.	Improperly adjusted inlet valve screw (15).	Adjust screw (15) counterclockwise.
Test pressure above 48 ±1 psig.	Improperly adjusted inlet valve screw (15).	Adjust screw (15) clockwise.
Pressure reducer creep exceeds 3 psig.	Inlet valve screw (15) out of adjustment.	Adjust inlet valve screw (15) clockwise approx. 1/8 of a turn until pressure is again 48 ± 1 psig.
Pressure reducer creeps more than 3 psig, but gradually shuts off before maximum gage pressure capacity.	Defective oxygen inlet orifice (4, figure 4-14).	Replace oxygen inlet orifice (4, figure 4-14).
	Defective inlet valve assembly (13).	Replace inlet valve assembly (13).
	Improper adjustment of pressure reducer lever (3, figure 4-12).	Readjust pressure reducer link screw (4, figure 4-12).
Pressure reducer creeps continually until it indicates supply pressure.	Leakage at gasket (5, figure 4-14) between oxygen inlet orifice (4, figure 4-14) and emergency valve body (1, figure 4-14).	Tighten orifice nut (3, figure 4-14) or replace gasket (5, figure 4-14).
	Defective thread in emergency valve body (1, figure 4-14).	If threads cannot be chased, replace emergency valve body (1, figure 4-14).

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

NOTE

The injector assembly is checked to determine at which pressure the injector nozzle unseats, allowing added flow of oxygen to the user.

1. Attach a 0-60 psi pressure gage to the flow indicator outlet port, which leads to the demand valve chamber.

2. Connect the regulator to test stand N_2. INPUT connection (18), and open INLET PRESS. ON/OFF valve (L)

3. Apply 150 psig, using LOW PRESS. REGULATOR (N), to the regulator inlet tee (4).

4. Gradually depress the diaphragm lever until oxygen starts to flow through the radial holes of the injector housing.

5. During the operation, the pressure gage attached to the flow indicator outlet port will slowly rise and then hesitate a few seconds before continuing to rise. This hesitation of the gage indicates the injector nozzle is lifting off the injector seat. When this condition exists, the pressure gage attached must read between 13 and 25 psig. If the pressure is not within tolerance, locate probable cause using troubleshooting chart (table 4-12).

NOTE

Repeat test after replacing injector spring if corrective action was necessary.

6. Fully depress the diaphragm lever (72) to check the injector assembly (27) for vibration. If vibration (howling) is noted, locate probable cause using troubleshooting chart (table 4-12).

Table 4-12. Troubleshooting (Injector Assembly)

Trouble	Probable Cause	Remedy
Unless otherwise noted, index numbers in parentheses refer to figure 4-13.		
Test pressure below 13 psig.	Injector spring (3) too weak.	Replace injector spring (3) with stronger spring.
Test pressure above 25 psig.	Injector spring (3) too strong.	Replace injector spring (3) with weaker one.
Excessive vibration howling of injector assembly (27, figure 4-10).	Damping spring (2).	Replace damping spring (2).

7. Close N_2 supply cylinder valve, bleed system using SYSTEM BLEED valve (S), relieve all pressure in the test stand, and disconnect N_2 INPUT connection 18. Remove regulator from test stand.

8. Back out LOW PRESS. REGULATOR (N) and secure all test stand valves.

4-104. DIAPHRAGM AND COVER ASSEMBLIES AND BOTTOM PLATE. To assemble the diaphragm and cover assemblies and bottom plate, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive	RTV-734 (CAGE 94499)

1. Carefully turn case over with relief valve (47, figure 4-10) facing down, being careful NOT to damage the diaphragm lever (72).

2. Place new bottom plate gasket (38) and bottom plate (34) with counter sink holes facing up over case (76).

3. Align 12 screw holes in gasket (38) and bottom plate (34) with screw holes in case (76).

4. Secure bottom plate gasket (38) and bottom plate (34) to case (76) with six screws (35).

5. Turn case over so that it is resting on bottom plate (34).

6. Place diaphragm ring gasket (50) on shoulder of case (76). Align notch of gasket with diaphragm lever bracket (70). Install one screw (37) through bottom cover (34) and gasket (38) to ensure alignment of gasket (50).

7. Turn up diaphragm link (74) and slide lower disc (49) over it.

8. Insert diaphragm link (74) through center hole in diaphragm assembly (36).

9. Slide diaphragm washer (51) over link protruding through diaphragm.

10. Screw nut (52) over two or three threads on diaphragm link (74) to prevent link from dropping out of diaphragm, and to allow free turning of the diaphragm during alignment.

11. Align diaphragm assembly (36) in position, turn case (76) and secure diaphragm assembly to case and bottom plate (34) with remaining five screws (37).

12. Tighten nut (52) on diaphragm link (74).

13. Place a small amount of rubber cement on diaphragm link (74) threads, install diaphragm knob (53), and secure.

14. Place cover assembly (57) over diaphragm and line up four screw holes in the case with those in the cover.

15. When the cover and case screw holes are lined up, the dial cover will be in correct position in relation to emergency valve and air valve.

16. Screw cover assembly (57) to case (76) with four screws (54).

4-105. AIR CHECK VALVE AND ANEROID BODY AND COVER ASSEMBLY. To assemble the Air Check Valve and Aneroid Body and Cover Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive	RTV-734 (CAGE 94499)
As Required	Krytox 240 AC, Type III, Lubricant	MIL-G-27617 NIIN 00-961-8995
As Required	Toluene	TT-T-548 (CAGE 81348)
As Required	Xylene	TT-X-916 (CAGE 81348)

NOTE

Spring washer (4, figure 4-16) must be crimped or bent 5/32 inch from flat surface before assembly.

1. If check valve and aneroid assembly (20, figure 4-10) was disassembled, reassemble as follows:

a. Place spring washer (4, figure 4-16) on the aneroid syphon on top of aneroid assembly (1).

b. Slide throttling plate (2) on top of spring washer (4). The spring washer fits around hub of throttling plate.

c. Place extended portion of plate retaining nut (3) through hole in throttling plate (2) and screw plate retaining nut (3) on top portion of aneroid assembly (1). Tighten nut securely against throttling plate.

2. Throttling plate (2) must rock and rotate freely and must NOT stick or cock; otherwise it will NOT shut off the flow of air at high altitudes.

NOTE

Throttling plate spring washer (4) must be just stiff enough to ensure proper positioning of throttling plate (2) and to prevent vibration which will cause excessive wear. Too stiff a spring will be detrimental to the action of the aneroid (1). Spring washer may be adjusted by bending.

3. Slightly ream hole in throttling plate (2) if it binds on extended portion of plate retaining nut (3).

NOTE

Exact position of air valve flange (5) will be determined during calibration.

4. Screw air valve flange (5) to the bottom portion of the aneroid assembly (1).

5. For a preliminary adjustment, screw flange (5) on the aneroid assembly (1) until flange is approximately 1/8 inch from the aneroid bottom.

6. After adjusting the flange, lock it in place with nut (6).

7. Place aneroid assembly (1), plate retaining nut (3) first, into check valve seat (7).

8. Screw air valve flange (5) into check valve seat (7) as far as it will go, using adjustable spanner wrench.

9. Place check valve spring (10) inside check valve retainer (9) and place check valve disc (8) on top of check valve spring.

NOTE

Ensure that check valve disc (8) moves freely when spring (10) is compressed. Ensure that retainer (9) is firmly clamped in place onto check valve seat (7) so that it will NOT move under vibration.

10. Snap check valve retainer (9) onto check valve seat (7).

11. Cement gasket (10, figure 4-15) to air valve body (4) using method described as follows:

a. Clean surface to be bonded with Xylene or Toluene and allow to air dry.

b. Coat the metal sealing surface of the air valve body (4) and gasket (10) with RTV-734 and allow to air dry for five minutes.

c. Bond gasket (10) to air valve body (4) and allow to cure at room temperature for 24 hours with a minimum relative humidity of 20%.

d. Visually examine to ensure there are no air pockets in the bond. The parts must be flat, even and firmly cemented to each other.

12. Paint gasket (9) with the same rubber cement and, with a pair of tweezers, place it in the bottom of the air valve cover assembly (1).

13. Apply a coating of grease (Krytox 240 AC) on the two cams of air valve body (4).

14. Slide air valve body (4) inside air valve cover (1) so the two molded ridges inside the cover ride in the two cams in the air valve body, permitting cover and body to separate partially when air valve body is held stationary and air valve cover assembly is rotated.

15. Slide air valve spring (8) over spring retainer (7) and place both inside air valve body (4).

16. Compress spring (8) and secure retainer (7) and cover (1) together with screw (5) and shakeproof lockwasher (6).

17. Insert air valve screen (3) around spring retainer (7) inside the air valve body (4).

18. Place gasket (19, figure 4-10) on shoulder of check valve seat (7, figure 4-16).

19. Insert check valve and aneroid assembly (20, figure 4-10) into case (76).

NOTE

Locating pin (77) is used to correctly position lever button (2, figure 4-15) in relation to the dial.

20. Line up locking pin (77, figure 4-10) in the case (76) with the hole in the air valve body and press air valve body and cover assembly (17) in position over the check valve and aneroid assembly (20).

21. Secure body and cover assembly (17) to case (76) with four screws (18).

4-106. FLOW INDICATOR ASSEMBLY. To assemble the flow indicator, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner, Adjustable	Fabricate IAW figure 4-5

1. Carefully pull a new piston seal (22, figure 4-18) over the diaphragm shield (20) and the outside of the frame (17) until the bead on the piston seal rests on the shoulder of the frame.

2. Place the frame (17) in the case (1) so that the white blinker plate is nearest the vent hole.

3. Install new packing washer (9) around rim of the frame (17). Ensure that the entire circumference is fitted properly.

4. Install ring (8) on top of the packing washer (9).

5. Install retaining ring (7), using spanner wrench. Use extreme care to avoid damage to the blinker plate.

6. Install dial (6) so that the two cutouts in the dial fit over the two knob pins (23). Install gasket (5).

7. Install dial glass (4) over dial (6) and secure bezel (2) to the case (1) using four screws (3).

4-107. FLOW INDICATOR INSTALLATION. To install the flow indicator, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730

WARNING

When using Series 2858-B1 or 2858-C1 regulators on portable oxygen systems, the oxygen flow indicator must be installed.

NOTE

There are two types of oxygen flow indicators: the older flow indicator P/N DJ-2-1 and the newer flow indicator P/N AN6029-1. Whenever possible, the new flow indicator should be used in place of the older flow indicator. Installation procedures are given for both.

1. Install oxygen flow indicator P/N DJ-2-1 as follows:

a. Ensure that flow indicator screen (33, figure 4-10) is installed in flow indicator outlet orifice of the regulator case (76). If screen is damaged or missing, install a new one.

b. Install elbow (31) into regulator case (76) using anti-seize tape.

c. Install extension (29) into end of elbow (31) Using anti-seize tape.

d. Install flow indicator (28) on extension (29) using anti-seize tape.

2. Install oxygen flow indicator P/N AN6029-1 as follows:

a. Ensure that flow indicator screen (33) is installed in flow indicator outlet orifice of the regulator case (76). If screen is damaged or missing, install a new one.

b. Install elbow extension (30) into regulator case (76) using anti-seize tape.

c. Install elbow (31) on extension elbow (30) using anti-seize tape.

d. Install flow indicator (28) on elbow (31) using anti-seize tape.

Section 4-5. Illustrated Parts Breakdown

4-108. GENERAL.

4-109. This section lists and illustrates the assemblies and detail parts of the regulators listed below, and manufactured by the Pioneer Central Division of Bendix Aviation Corp., Code Number (CAGE 06840 and 19315).

Part No.

2858-A1
2858-A1A
2858-B1
2858-C1

4-110. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

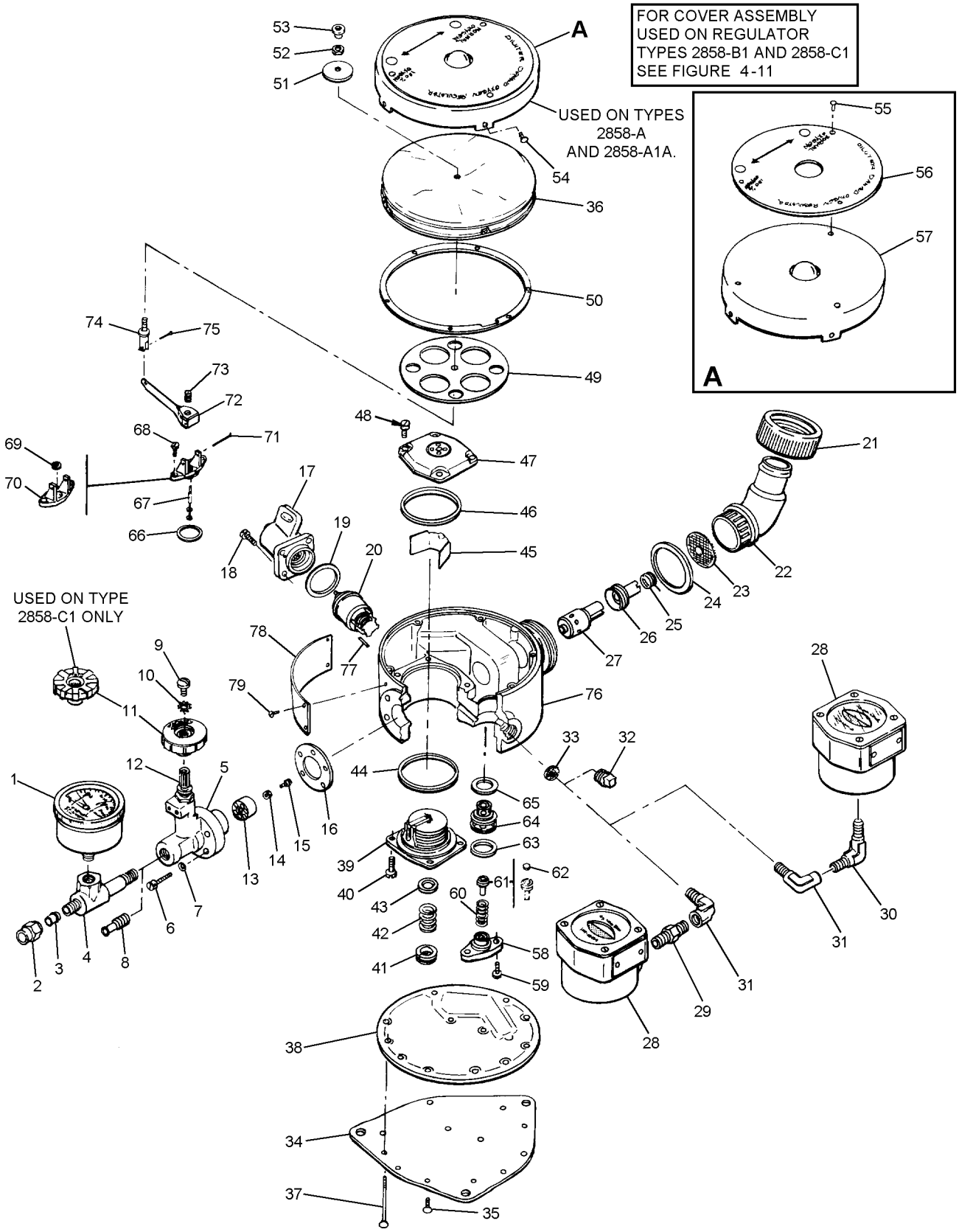


Figure 4-10. Diluter Demand Oxygen Regulator Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-10	2858-A1	REGULATOR, Diluter demand oxygen	REF	A
	2858-A1A	REGULATOR, Diluter demand oxygen	REF	B
	2858-B1	REGULATOR, Diluter demand oxygen	REF	C
	2858-C1	REGULATOR, Diluter demand oxygen	REF	D
-1	11135	. GAGE, Oxygen	1	A,B,D
-2	AN805-3	. NUT	1	
-3	AN800 3	. CONE	1	
-4	C800349-1	. TEE	1	A,B,C
-5	C800493-2	. VALVE ASSEMBLY, Emergency (figure 4-14 for BKDN) (ATTACHING PARTS)	1	
-6	B801503-1	. SCREW	4	
-7	LWO-4BN	. LOCKWASHER	4	
		---*---		
-8	AN913-1	. . PLUG, Shipping	1	A,C,D
-9	PB50859-1	. . SCREW	1	
-10	SLWO-1808BN	. . LOCKWASHER, Shakeproof	1	
-11	C800274-1	. . KNOB, Emergency valve	1	
	C800204 1	. . KNOB, Emergency valve	1	
-12	PB52099-1	. . STOP, Emergency valve	1	D
-13	PB53670-1	. INLET VALVE ASSEMBLY (figure 4-17 for BKDN)	1	
-14	NO-2	. . NUT	1	
-15	PB52684-1	. . SCREW	1	
	PB52684 2	. . SCREW	1	
-16	PB50835-2	. GASKET, Oxygen inlet	1	
-17	PC52176-3	. BODY AND COVER ASSEMBLY (figure 4-15 for BKDN) (ATTACHING PARTS)	1	D
-18	FFILO-606BN	. SCREW	4	
-19	PB53677-1	. GASKET	1	
-20	PB52720-3	. AIR CHECK VALVE AND ANEROID ASSEMBLY (figure 4-16 for BKDN)	1	A,B,C
-21	PB53863-1	. NUT, Elbow	1	
	PB53425-1	. ELBOW ASSEMBLY	1	
-22	PC52776-1	. . ELBOW	1	
-23	PB50815-2	. . BAFFLE ASSEMBLY, Elbow	1	
-24	PB51219-1	. GASKET	1	
-25	PB51086-1	. SPRING, Lock	1	
-26	PB50840-1	. VENTURI	1	
-27	B800494-1	. INJECTOR ASSEMBLY (figure 4-13 for BKDN)	1	
-28	DJ-2-1	. INDICATOR, Oxygen flow (figure 4-18 for BKDN)	1	
	AN6029-1	. INDICATOR, Oxygen flow (Note 1)	1	
-29	3325X2	. EXTENSION (Note 2)	1	
-30	B-2-ME	. ELBOW, Male pipe (CAGE 1164907187)	1	
	4046866-12	(Note 3)		

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-10-31	3400X2	. ELBOW	1	
-32	B800510-1	. PLUG	1	
-33	PB50428-1	. SCREEN, Flow indicator	1	
-34	PC52098-1	. PLATE, Bottom (ATTACHING PARTS)	1	
-35	FO-404B	. SCREWS	6	
	FO-404BN	. SCREWS ---*---	6	
-36	PB52084-1	. DIAPHRAGM ASSEMBLY (ATTACHING PARTS)	1	
-37	PB52072-1	. SCREW ---*---	6	
-38	PB52097-1	. GASKET, Bottom plate	1	
-39	B812010-1	. REDUCER ASSEMBLY, Pressure (figure 4-12 for BKDN) (ATTACHING PARTS)	1	
-40	FFILO-605	. SCREW ---*---	4	
-41	PB52073-1	. . SCREW, Adjusting	1	
-42	PB50785-1	. . SPRING, Bellows	1	
-43	PB53203-1	. . SPACER	1	
-44	PB50834-2	. GASKET	1	
-45	PB54270-1	. DAMPENER, Bellows	1	
-46	PB50834-2	. GASKET	1	
-47	PB50790-1	. VALVE ASSEMBLY, Relief (ATTACHING PARTS)	1	
-48	FFILO-605	. SCREW ---*---	4	
-49	PB50853-1	. DISC, Lower Diaphragm	1	
-50	PB52085-1	. GASKET, Diaphragm	1	
-51	PB50854-1	. WASHER, Diaphragm	1	A,B
-52	NO-3BN	. NUT	1	A,B,C
-53	B801204-1	. KNOB, Diaphragm		C,D
-54	RO-303BN	. SCREW	4	
	PC53420-2	. COVER ASSEMBLY	1	A,B
	C801146-1	. COVER ASSEMBLY (figure 4-11 for BKDN)	1	D
	C801146-2	. COVER ASSEMBLY (figure 4-11 for BKDN) (ATTACHING PARTS)	1	C
-55	RRO-202A	. RIVET ---*---	3	
-56	PD53878-1	. . DIAL	1	
-57	PB53409-1	. . COVER	1	C
-58	PB50845-1	. CAP, Low pressure valve (ATTACHING PARTS)	1	
-59	FFILO-605	. SCREW ---*---	2	
-60	PB50848-1	. SPRING	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-10-61	PB53958-1	. SEAT, Demand valve	1	D
	B812022-1	. SEAT, Demand valve	1	D
-62	PB53957-1	. SEAT HOLDER, Demand valve	1	
-63	PB50834-3	. GASKET	1	
-64	PB52544-1	. VALVE, Demand	1	
-65	PB50775-2	. GASKET	1	
-66	PB50775-2	. GASKET	1	
-67	B800593-1	. STEM, Demand valve	1	
	B800162-1	. BRACKET AND BUSHING ASSEMBLY	1	
	B800162-2	. BRACKET AND BUSHING ASSEMBLY (ATTACHING PARTS)	1	
-68	EFILO-605	. SCREW ---*---	2	
-69	B800163-1	. . BUSHING	1	
	B800163-2	. . BUSHING	1	
-70	C800164-1	. . BRACKET, Diaphragm lever	1	
	PB52706-3	. LEVER ASSEMBLY, Diaphragm (ATTACHING PARTS)	1	A,B
-71	PB50788-4	. PIN ---*---	1	
-72	PC52673-1	. . LEVER, Diaphragm	1	
-73	B801340-1	. . SETSCREW	1	
-74	PB50803-1	. . LINK, Diaphragm	1	
-75	PB50788-3	. . PIN	1	
	PC53231-2	. CONE AND LOCATING PIN	1	
-76	PE52780-1	. . CASE	1	
-77	PB53586-1	. . PIN, Locating	1	
-78	PC53687-4	. IDENTIFICATION PLATE	1	A,B
		. IDENTIFICATION PLATE (ATTACHING PARTS)	1	C,D
-79	0-330-3	. SCREW, Self-tapping	4	

Notes:
1. When replacing Oxygen Flow Indicator P/N DJ-2-1, replace with Oxygen Flow Indicator P/N AN6029-1.
2. Extension P/N 3325X2 is used when securing Oxygen Flow Indicator P/N DJ-2-1 to regulator.
3. Elbow, male pipe, P/N B-2-ME and 4046866-12 are used for securing Oxygen Flow Indicator P/N AN6029-1 to regulator.

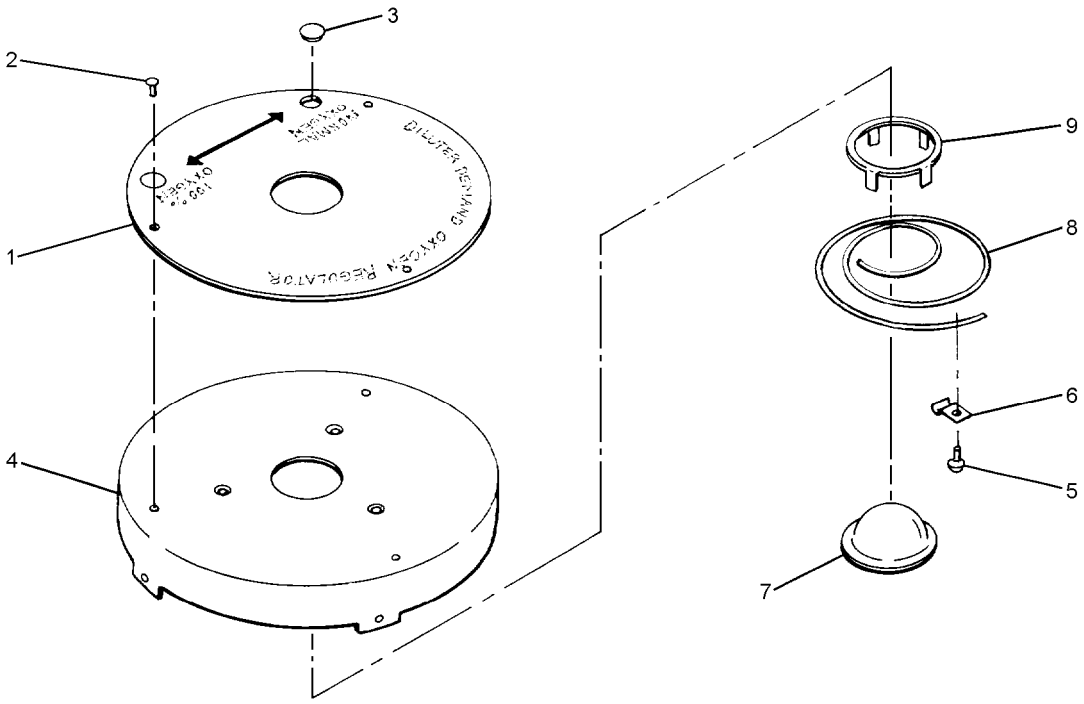


Figure 4-11. Cover Assembly – Pioneer Type 2858-B1 and 2858-C1

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-11	C801146-1	COVER ASSEMBLY	REF	D
	C801146-2	COVER ASSEMBLY (figure 4-10 for NHA)	REF	C
-1	PD53878-1	. DIAL (ATTACHING PARTS)	1	
-2	RRD-202A	. RIVET ---*---	3	
-3	B800652-1	. . BUTTON	2	
-4	PB53409-1	. COVER	1	
	B801150-1	. . DEPRESSOR ASSEMBLY (ATTACHING PARTS)	1	
-5	RRO-202A	. . RIVET	3	
-6	B801092-1	. . CLIP, Spring ---*---	3	
-7	B801094-1	. . . DIAPHRAGM, Depressor	1	
-8	B801095-1	. . . SPRING	1	
-9	B801093-1	. . . RING, Spring retaining	1	

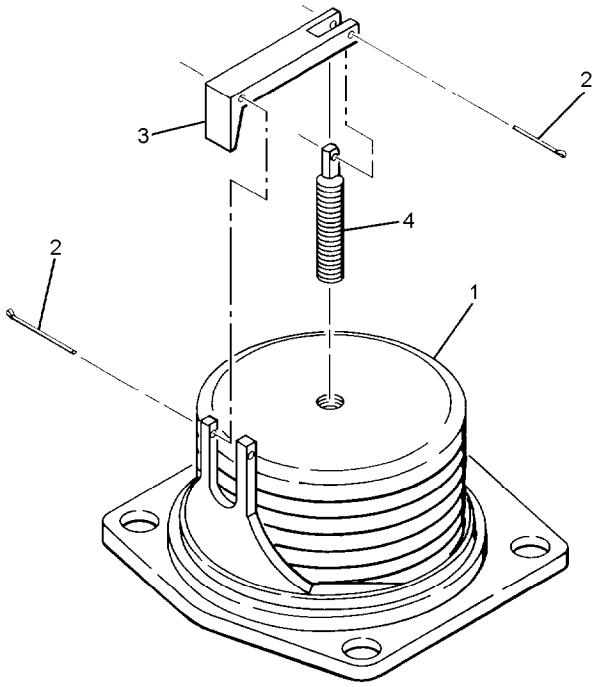


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Figure 4-12. Pressure Reducer Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-12	B812010-1	REDUCER ASSEMBLY, Pressure	REF	B,C,D
	PB50777-1	REDUCER ASSEMBLY, Pressure . . . . . (figure 4-10 for NHA)	1	A
-1	PB50778-1	. REDUCER, Pressure	1	
-2	PB50788-5	. PIN	2	
-3	PB50782-1	. LEVER, Pressure reducer	1	
-4	PB50783-1	. SCREW, Pressure reducer link	1	

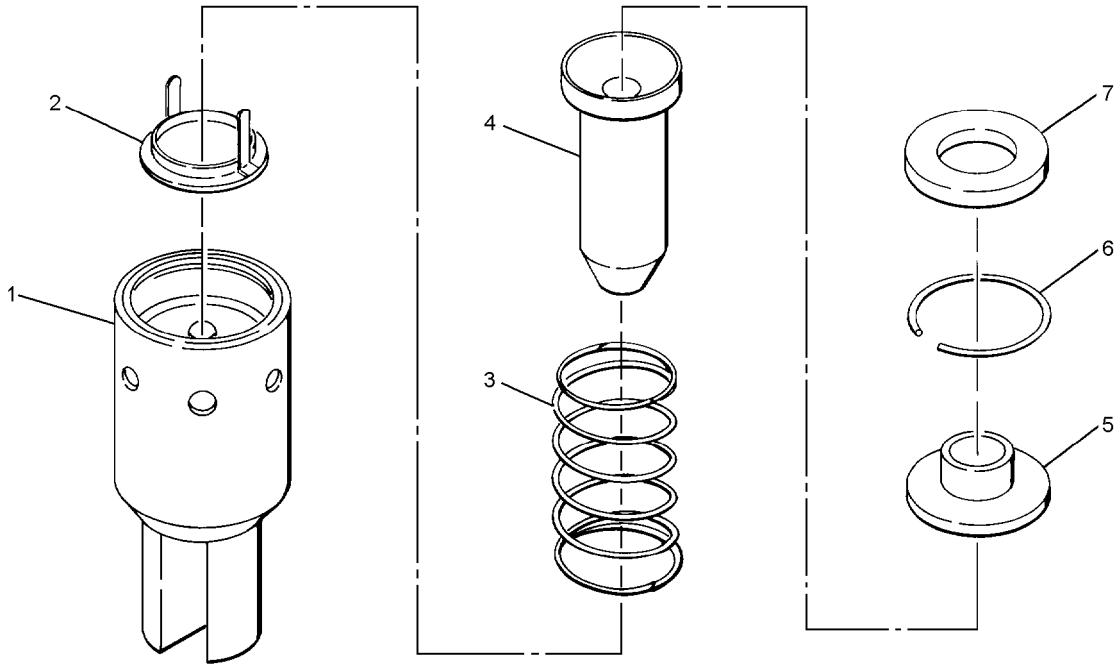

Figure 4-13. Injector Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-13	B800494-1	INJECTOR ASSEMBLY . . . . . (figure 4-10 for NHA)	REF	
-1	PB50797-1	. HOUSING, Injector	1	
-2	PB50342-1	. SPRING, Damping	1	
-3	PB54188-1	. SPRING, Injector	1	
-4	PB50798-1	. NOZZLE, Injector	1	
-5	PB50800-1	. SEAT, Injector	1	
-6	PB50801-1	. RING, Injector snap	1	
-7	PB50834-1	. WASHER		

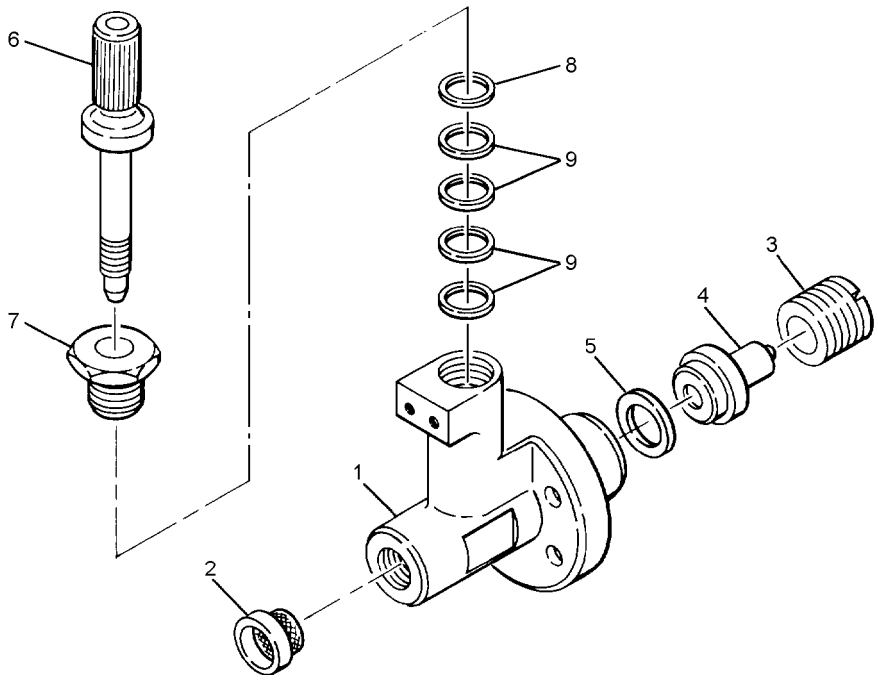

Figure 4-14. Emergency Valve Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-14	C800493-2	VALVE ASSEMBLY, Emergency . . . . . (figure 4-10 for NHA)	REF	
-1	PB51693-2	. BODY, Emergency valve	1	
-2	PB53827-1	. SCREEN AND RETAINER ASSEMBLY	1	
	PB53827-2	. SCREEN AND RETAINER ASSEMBLY	1	
-3	PB52083-1	. NUT, Orifice	1	
-4	B801604-1	. ORIFICE, Oxygen inlet	1	
-5	PB50775-4	. GASKET	1	
-6	PB53045-1	. SHAFT ASSEMBLY, Emergency valve	1	
-7	PB52075-1	. NUT, Stuffing box	1	
-8	PB52076-1	. WASHER	1	
-9	PB52077-1	. PACKING	4	

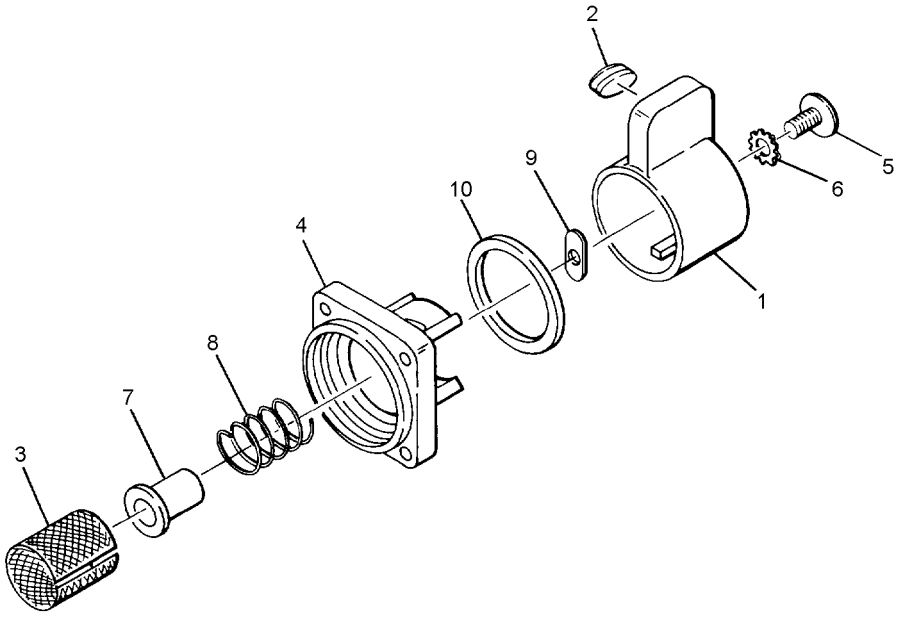

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Figure 4-15. Body and Cover Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-15	PC52176-3	BODY AND COVER ASSEMBLY . . . . . (figure 4-10 for NHA)	REF	
-1	PA52091-1	. COVER ASSEMBLY, Air valve	1	A,B,C
	PB52091-3	. COVER ASSEMBLY, Air valve	1	D
-2	B812005-1	. BUTTON, Lever	1	D
	PB52093-1	. BUTTON, Lever	1	C
-3	PB50870-2	. SCREEN	1	
-4	PC52683-1	. BODY, Air valve	1	
-5	PB50859-2	. SCREW	1	
-6	SLWO-1808BN	. LOCKWASHER, Shakeproof	1	
-7	PB52165-1	. RETAINER, Spring	1	
-8	PB50869-1	. SPRING, Air valve	1	
-9	PB53150-1	. GASKET, Air valve body	1	
-10	PB50873-1	. GASKET	1	

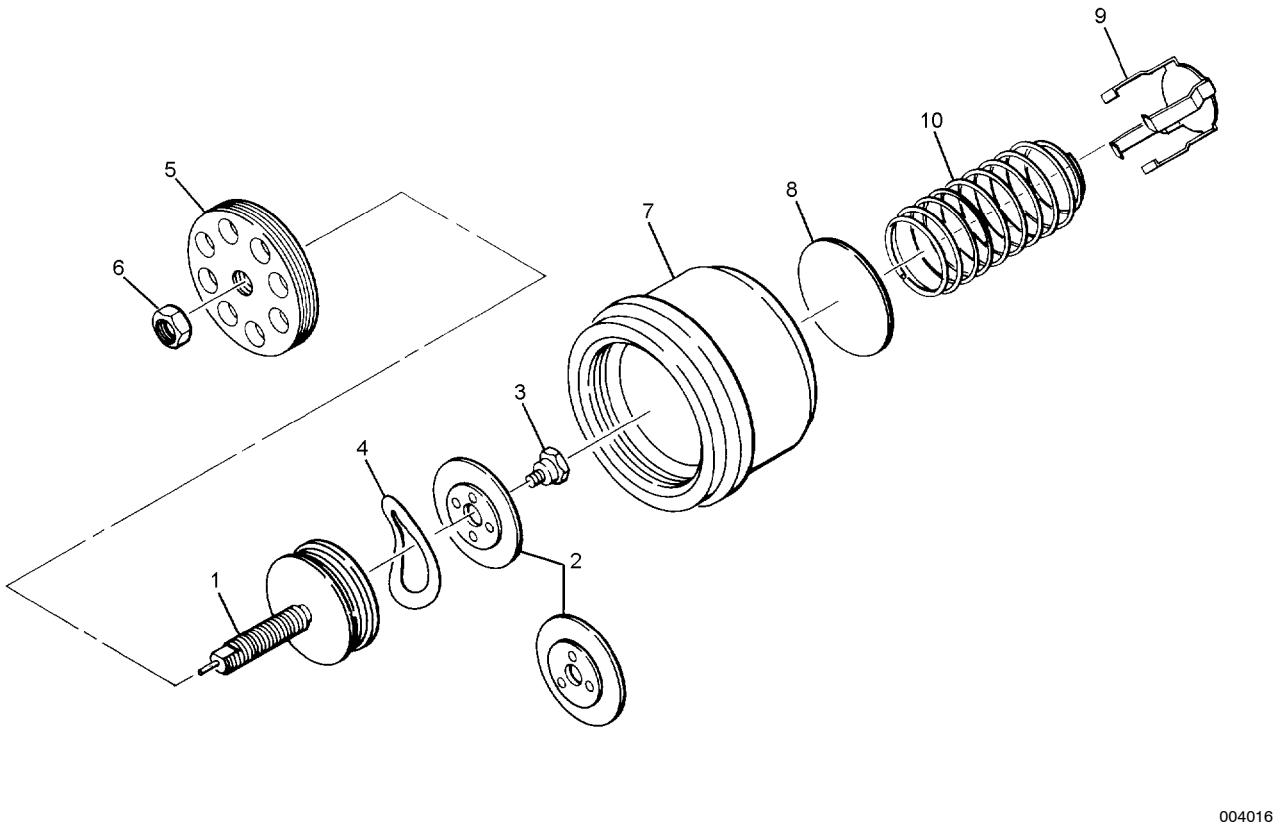
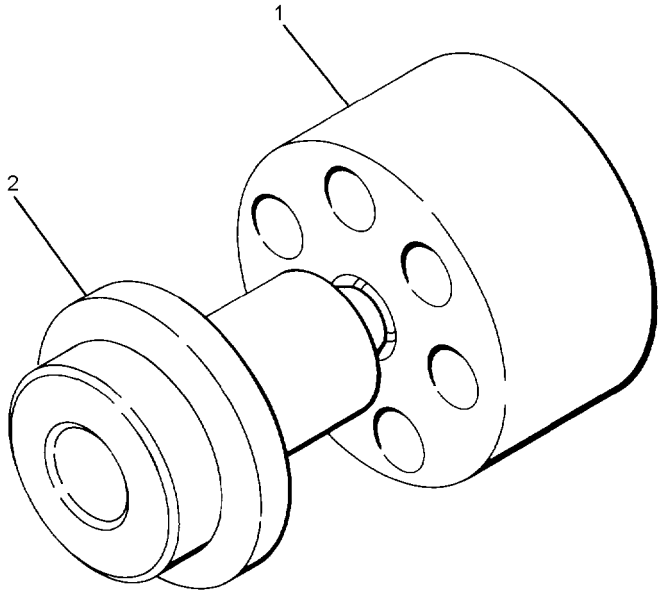


Figure 4-16. Air Check Valve and Aneroid Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-16	PB52720-3	AIR CHECK VALVE AND ANEROID ASSEMBLY (figure 4-10 for NHA)	REF	
-1	PB50821-1	. ANEROID ASSEMBLY	1	
-2	PB50826-1	. PLATE, Throttling	1	
-3	PB50827-1	. NUT, Plate retaining	1	
-4	PB50828-1	. WASHER, Spring	1	
-5	PB52721-1	. FLANGE, Air valve	1	
-6	NO-10	. NUT	1	
-7	PC52678-1	. SEAT, Check valve	1	
-8	PB53041-1	. DISC, Check valve	1	
-9	PB50832-1	. RETAINER, Check valve	1	
-10	PB50833-1	. SPRING, Check valve	1	



004017

Figure 4-17. Inlet Orifice and Inlet Valve Matched Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-17	PB53670-1	INLET VALVE ASSEMBLY . . . . . (figure 4-10 for NHA)	REF	
-1	NO NUMBER	. INLET VALVE AND INSERT ASSEMBLY	1	
-2	NO NUMBER	. ORIFICE, Oxygen inlet	1	

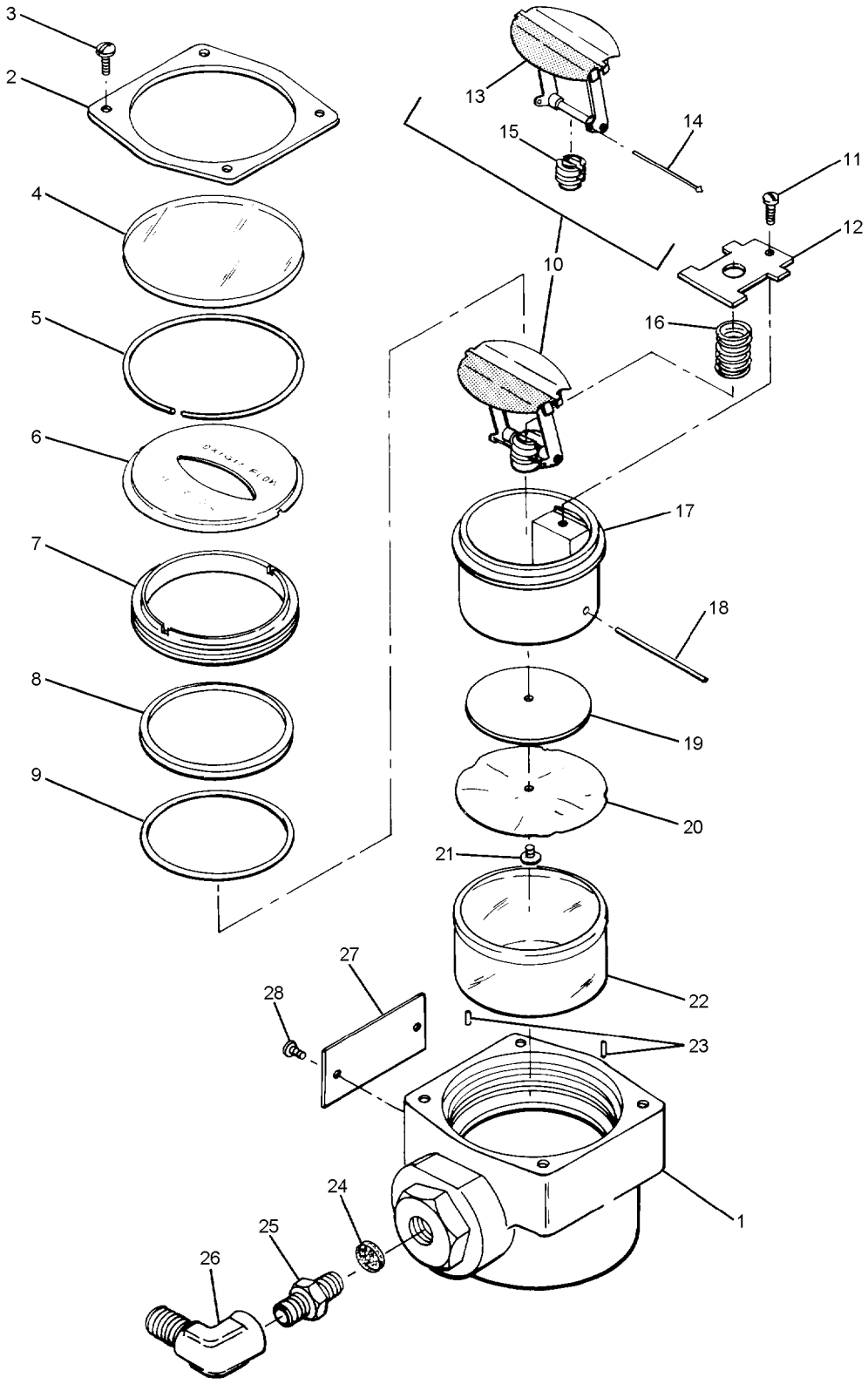


Figure 4-18. Oxygen Flow Indicator – Pioneer Type DJ-2-1

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-18	DJ-2-1	INDICATOR ASSEMBLY, Oxygen flow ..... (figure 4-10 for NHA)	REF	
-1	D7114-93-1	. CASE	1	A
	D813183	. CASE	1	B,C,D
-2	PB52332-1	. BEZEL ..... (ATTACHING PARTS)	1	
-3	ST406SBN	. SCREW, Self-tapping ..... ---*---	4	
-4	PB52333-1	. GLASS, Dial	1	
-5	PC51217-7	. GASKET	1	A
	PC51217-6	. GASKET	1	B,C,D
-6	PC52342-1	. DIAL	1	
-7	B800109-1	. RING, Retaining	1	
-8	PB52670-1	. RING	1	
-9	PB53330-1	. WASHER, Packing	1	
-10	B800110-1	. LEVER ASSEMBLY ..... (ATTACHING PARTS)	1	
-11	ST406SBN	. SCREW, Self-tapping	1	
-12	PB41821-1	. PLATE ..... ---*---	1	
-13	B796679-1	. . LEVER AND PLATE ASSEMBLY	1	A
	B800113-1	. . LEVER AND PLATE ASSEMBLY	1	B,C,D
-14	PB50788-4	. . PIN	1	
-15	B800114-1	. . HUB, Diaphragm	1	
-16	PB41838-1	. SPRING	1	
-17	PD41835-1	. FRAME	1	
-18	PB41820-1	. PIN	1	
-19	PB41833-1	. PLATE, Diaphragm	1	
-20	PB54242-1	. SHIELD, Diaphragm ..... (ATTACHING PARTS)	1	
-21	PB54190-1	. SCREW ..... ---*---	1	
-22	PB53606-2	. SEAL, Piston	1	
-23	PB23563-1	. PIN, Knob	2	
-24	PB50428-1	. SCREEN	1	
-25	3325X2	. EXTENSION (Note 1)	1	
-26	3400X2	. ELBOW	1	
-27	C80070-1	. PLATE, Name ..... (ATTACHING PARTS)	1	
-28	0-330-1	. SCREW, Self-tapping ..... ---*---	2	
	Notes: 1. Oxygen Flow Indicator (P/N DJ-2-1) is attached to Regulator Case (P/N PE52780-1) with Elbow (P/N 3400X2) and Extension (P/N 3325X2). When replacing with new Oxygen Flow Indicator P/N AN6029-1, use Elbow, male-pipe (P/N B-2-ME and 4046866-12) (figure 4-10).			

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B800110-1	4-18-10	
B800113-1	4-18-13	
B800114-1	4-18-15	
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B800163-2	4-10-69	
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B801150-1	4-11-4	
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B801340-1	4-10-73	
B801503-1	4-10-6	
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B812010-1	4-12	
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B812022-1	4-10-61	
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